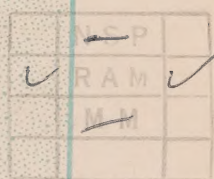


**UGANDA
GOVERNMENT**



**Annual Report
of the
AGRICULTURE
DEPARTMENT**



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**Annual Report of the
AGRICULTURE DEPARTMENT**

For the year ended 31st December, 1962

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AGRICULTURE DEPARTMENT



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CONTENTS

FOREWORD by the Hon. M. M. Ngobi, M.P., M.L.A.,
Minister of Agriculture and Co-operatives

	<i>Paragraphs</i>
I. INTRODUCTION	1- 17
II. WEATHER	18
III. FOOD CROPS AND FOOD SUPPLIES	19- 20
IV. ECONOMIC CROPS:	
(a) Cotton	21- 31
(b) Coffee	32- 51
(c) Tobacco	52- 65
(d) Oil Seeds	66- 70
(e) Maize	71
(f) Tea	72- 73
(g) Sugar	74
(h) Cocoa	75
(i) Sisal	76
(j) Minor Crops	77- 78
V. AGRICULTURAL DEVELOPMENT AND EXTENSION WORK:	
(a) Soil Conservation	79- 82
(b) Agricultural Education	83- 92
(c) Animal Husbandry and Pasture Work	93- 94
(d) Irrigation and Swamp Reclamation	95-101
(e) Resettlement	102-107
(f) Liaison with Local Government	108
(g) Mechanical Cultivation	109-129
(h) Progressive Farmers	130-132
VI. INVESTIGATIONS	133
(a) General	134-154
(b) Soil and Land Use Surveys	155-159
(c) Soil and Plant Chemistry—General	160-165
(d) Pesticide Research	166
(e) Stored Products Pests	167
(f) Chemical Analysis	168
(g) Crop Protection Machinery	169
(h) General Entomology	170
(i) Crop Investigations and Research Annual Crops	171-209
(j) Crop Investigations and Research Perennial Crops	210-252
(k) Pasture Agronomy	253-264
(l) Livestock	265-272
VII. STAFF	273-276
VIII. ACKNOWLEDGMENTS	277
IX. APPENDICES	

FOREWORD

The economy of Uganda is firmly based on Agricultural production. Two-thirds of the gross domestic product is derived from farming and over 90 per cent of all exports are products of the land.

Cotton and coffee are our major export crops and they provide the main sources of national income. Although the majority of Uganda farmers are still subsistence cultivators, nevertheless their industry produces in addition to all local food requirements a coffee crop which is by far the largest of all Commonwealth producing countries. In fact during 1962 only three nations in the world exported more coffee than Uganda. In the field of cotton growing only India and Pakistan of the Commonwealth countries exceed the Uganda production.

Although this is an impressive record, a great deal more cotton could be produced if a few simple rules were followed by the majority of cultivators. It is estimated that yields could be doubled merely by planting early, spacing properly and spraying efficiently, and the Agricultural Department encourages all growers to adopt these simple methods of improved husbandry. Progressive farmers are the spearhead of this campaign and Government provides loan and subsidy schemes to help all farmers who are willing to follow departmental advice. In addition, during 1962, from July onwards Government agreed to the issue of free insecticide to cotton growers, and as a result over 100,000 acres of cotton were sprayed by the growers themselves. It is often stated that cotton production in Uganda has not increased at all in recent years. This is not true. Figures for 5 years' averages show a steady rise since the last war, and this has been achieved in spite of a very large drop in production from Buganda where growers over the last decade have tended to concentrate more on coffee production. This means that there has been a considerable increase in cotton production from the Eastern and Northern Regions, and to some extent from those parts of the Western Region that are able to grow cotton.

An excellent start has been made in the drive to expand tea production by outgrowers in the Western Region. This is part of Government's policy to broaden the base of the country's economy and establish other export crops in addition to cotton and coffee. Efforts were also made during the year to establish exports of graded groundnuts and encouragement was given to producers of the many and varied minor crops produced in Uganda by the establishment of fixed minimum prices.

This report also contains much of interest in the section devoted to investigational work. It is essential to have a sound basis of research and experimentation upon which to base extension advice to farmers in the field. However, it must be noted that the staff position within the Department, both in the research and extension services, is not satisfactory, and it is to be hoped that more Ugandans will realise the very great importance of agriculture to the country and come forward to fill the vacancies that at present exist in the Agricultural Colleges, where staff for the Department are trained.

M. M. NGOBI,
Minister of Agriculture and Co-operatives.

ENTEBBE,
8TH MAY, 1964.

UGANDA GOVERNMENT

DEPARTMENT OF AGRICULTURE

ANNUAL REPORT

For the Year ended 31st December, 1962

I. INTRODUCTION

(a) Policy

THE main aims of the Department during the year were:—

- (i) To ensure adequate supplies of the foodstuffs which can be efficiently produced under local conditions.
- (ii) To conserve the soil and water and other natural resources.
- (iii) To increase production and improve the quality of cash crops to enable farmers to enjoy a better standard of living and to increase the general revenue of the country.
- (iv) To improve the quality and productivity of livestock and to integrate animals into the farming system where appropriate to the development of sound systems of farming.

2. Uganda is blessed with fertile soils, well-distributed rainfall and an abundance of good cultivable land. However, there are also problems, notable among which are lack of adequate capital for development, inefficient utilisation of labour and managerial ability and the marketing of crops other than cotton and coffee.

3. The year saw further expansion and emphasis in the programme to encourage farmers to turn from subsistence to commercial farming and to give the Progressive or Emergent Farmer "the tools with which to do the job" in addition to advise in management. Under the Agricultural Equipment Subsidy Scheme, Progressive Farmers were enabled to purchase at subsidised prices equipment which was selected with a view to helping them to plough, plant and weed their crops quickly and efficiently with the use of oxen, in addition to a large range of equipment designed to help in the enclosure of land and the processing of produce and the control of pests and diseases of cash crops. In addition the Progressive Farmers' Loan Scheme continued to help farmers to buy the necessary equipment to farm their land properly, increase their profits and improve their standard of living.

(b) General Review

4. The results of the abnormally heavy second rains of 1961 were felt during the early part of 1962 as communications were still disrupted and a shortage of cash in farmers' hands limited the purchase of equipment and hence the adoption of improved techniques. However, the weather in 1962 has been eminently favourable to crop growth.

5. Although shortages of certain foodstuffs occurred at different times of the year, particularly during the first half of the year in the grain growing areas, the food position was generally satisfactory throughout the country. Local food shortages in parts of Ankole and Kigezi resulting from the influx of Rwanda refugees were less noticeable during the year than during 1961.

6. Cotton lint production from the 1961/62 crop amounted to 181,137 bales, excluding 110 bales from research stations. This was 189,885, bales below the previous season's crop, and was extremely disappointing. A record acreage of over 2 million had been planted and at one time there was a prospect of a record crop; however, exceptionally wet weather during the last quarter of 1961, which continued into 1962, resulted in a delayed maturity and ideal conditions for various boll-rotting fungi, and the crop was drastically reduced.

7. The acreage of the 1962/63 cotton crop is estimated at 1,803,459, a considerable fall in acreage having occurred in Buganda. Growth has been good. At the end of the year, the crop forecast stood at 387,200 bales, which will be worth approximately £12,300,000 to the farmers.

8. The total value of the coffee crop to all coffee growers in 1962 was a little over £14½ million, compared with £10 million in 1961. This includes £1,962,439 realised in Bugisu during 1961/62, which was more than twice the cash return received by Bugisu Arabica Coffee growers in the previous season.

9. The total value of tobacco to growers during the year amounted to over £290,000, an increase of 50 per cent over 1961.

10. By the end of the year, the total acreage of tea established by African outgrowers amounted to 963, the acreage having been more than doubled in the Western Region. Total production of made tea was 6,195 tons from a total bearing area of 13,600 acres.

11. Sugar production progressed satisfactorily and a record total of 104,300 tons was produced. The acreage of sugar planted by outgrowers on the two main sugar estates rose to 1,765 during the year.

12. Increased attention continued to be paid to the production and marketing of minor crops, including groundnuts and spices. The total purchases of groundnuts in the Eastern Region, the main producing area, amounted to 12,000 tons. A Pilot Grading Scheme designed to extract the portion of the crop suitable for the confectionery trade and to assess the value of the grading of groundnuts generally, was successfully carried out in Busoga. The products received an enthusiastic reception from the trade in the United Kingdom.

13. Participation by farmers in the processing of their crops continued to increase and the number of estate coffee factories operated by Co-operative

Societies and Associations of Growers rose to 36. The portion of the total coffee crop, including Bugisu Arabica, processed by African concerns in 1961/62 was 63 per cent. Eighteen per cent of the cotton production was ginned by co-operative ginneries during 1961/62, compared with 14 per cent in the 1960/61 season.

14. The two main Farm Colleges at Bukalasa and Arapai had a successful year although, due to shortage of applicants, neither of the Colleges was full. Fifty-eight students successfully completed their training at certificate level at the two Colleges. Seven of these were selected for the 1963 Diploma Class and the rest were appointed as Agricultural Assistants. Three of the Agricultural Assistants were women. From Bukalasa, two students qualified for the Diploma in Agriculture and were subsequently appointed as Assistant Agricultural Officers.

15. Five District Farm Institutes were in operation during the year and 3,836 farmers took advantage of the short courses offered, compared with 900 in 1961. These courses were generally of two weeks' duration but a number of courses of one week to ten days were also held on such subjects as farm building, ox-training, poultry husbandry and fencing. The general courses gave instruction to farmers in improved agricultural techniques such as row cropping and the utilisation of ox-drawn implements, together with teaching the importance of good agricultural practices such as early planting, proper spacing, spraying cotton and soil conservation.

16. Further progress was made in the control of major crop pests. Approximately 111,200 acres of cotton were sprayed by farmers against boll-worms and *Lygus* (*Lygus vosseleri*) compared with 16,000 in 1961. Free spraying by the Department against *Antestia* on Arabica coffee continued in the Western Region and Bugisu where a total of 7,741 and 7,700 acres respectively were sprayed.

17. Despite preoccupation with the drive to increase production of cash crops and the concentration by extension staff on Progressive Farmers, soil and water conservation on both grazing and arable land and the safeguarding of food supplies continued to be an important feature of the work of the Department.

II. WEATHER

18. January, normally a dry month, was wet in most areas. The abnormally heavy rains which were experienced during the last quarter of 1961, persisted into 1962, and January, normally a dry month, was wet in most areas. Spring rains broke in March and were normal in intensity, distribution and duration. The mid-year dry period started in May. The autumn rains started in August and were generally heavier than normal but damage to crops was nowhere serious.

III. FOOD CROPS AND FOOD SUPPLIES

19. The weather during the year was favourable for crop growth. Although in some areas acreages were reduced, the excellent yields obtained made up for this decrease. Owing to the reduced acreage of food crops planted in 1961

and the poor yields obtained, slight shortages of certain foods occurred in a few places in the predominantly grain growing areas, particularly during the first half of the year. In Karamoja, the food position was generally unsatisfactory, mainly as a result of cattle raids and skirmishes, which in many areas caused whole families to evacuate their homes during the time of planting the main grain crops.

20. Production of food crops was on a satisfactory scale and the food reserves which had been depleted following the indifferent harvests of 1961 were built up. The large acreages of cassava and sweet potatoes planted in the heavy rains of 1961 gave high yields and plantains were more than adequate in many areas of Buganda. The early rains in January and March provided ideal conditions for early planting of finger millet and the crop yielded so heavily that although large sales were reported from the main growing areas, reserves in growers' hands remained plentiful.

IV. ECONOMIC CROPS

(a) Cotton

21. This report deals with the marketing of the 1961/62 crop and the production of the 1962/63 crop.

1961/62 Season

TABLE A—COTTON PRODUCTION

1952/53—1961/62

Season	Estimated acreage	Bales of lint (400 lb.)	Average yields of seed cotton per acre	Average price to growers for 100 lb. seed cotton
			<i>lb.</i>	<i>Shs. cts.</i>
1952/53 ..	1,472,553	319,992	290	48 60
1953/54 ..	1,611,223	397,594	325	49 40
1954/55 ..	1,738,821	299,831	227	58 81
1955/56 ..	1,585,500	363,449	305	52 11
1956/57 ..	1,568,539	372,185	313	53 34
1957/58 ..	1,617,013	350,693	288	54 90
1958/59 ..	2,014,020	400,682	263	44 20
1959/60 ..	1,564,744	360,260	300	44 81
1960/61 ..	1,516,155	371,022	318	52 23
1961/62 ..	2,072,121	181,137	113	52 06

22. The 1961/62 harvest was extremely disappointing. Although a record acreage had been planted and there were prospects of a record crop, the exceptionally wet weather had a disastrous effect on yields and the crop was the lowest since the 1947/48 season. In the Eastern Region, the main cotton producing area, it was the lowest crop since 1942/43. The average yield was 113 lb. of seed cotton per acre compared with 318 lb. in 1960/61. In Buganda, the yield was 152 lb. seed cotton per acre, while in the Teso Zones the average yield was only 41 lb. per acre.

23. During January, picking and marketing were hindered by rain which also caused losses in the field. Flooding interfered with movement of the crop by

road and river. During February, picking and marketing proceeded rapidly but the work was once more delayed in March with the outbreak of the spring rains.

24. Prices to the growers for clean raw cotton were 57 and 56 cents per lb., for B.P.52 and S.47 growths respectively. Stained raw cotton was priced at 20 cents per lb. in all zones except West Nile where the price was 23 cents per lb. It is estimated that the total return to the growers from the sale of the 1961/62 crop was £6,106,300. The crop (lint and seed) realised £8,074,529 on the Kampala auctions.

25. The cotton growing areas are divided into 15 zones. Within each zone, a statutory ginning pool is established, under which each ginner receives a regulated quota of the raw cotton produced. The number of cotton ginneries in operation during the 1961/62 season was 131, of which fourteen (3 in Buganda, 8 in the Eastern Region, 1 in the Western Region and 2 in the Northern Region) were operated by Growers Co-operative Unions.

1962/63 Season

26. Early in the 1962/63 cotton season a campaign was started to encourage farmers to increase their acreage and to obtain higher yields by early planting. The campaign utilised press releases, public meetings, radio talks, pamphlets, posters and individual visits, but, following the disappointing crop of 1961, planting was slow to start. The May planted crop in Buganda suffered slightly from the dry weather in June–July, which also delayed further plantings in the Kingdom until nearly the end of July. Throughout the main growing areas, however, after the dry spell of June and July, activity greatly increased and a good acreage estimated at 1,803,459 resulted. In all zones the percentage of the acreage planted late was higher than in recent years. Fortunately, growing conditions in the latter half of the year were favourable for this late planted crop. Marketing started in November and by the end of the year seed cotton equivalent to some 50,000 bales of lint had been bought.

27. Prior to 1962/63 season, all ginning of cotton was undertaken by co-operatively owned ginneries and privately owned ginneries under a system of statutory Pool Agreements, which allocated the total crop grown in each zone on a mutually agreed basis irrespective of the origin of the cotton. Under the Cotton (Amendment) Act, 1962, the Minister of Agriculture and Co-operatives was given powers to allocate to co-operative ginneries that proportion of the crop which was grown by co-operative members, subject to the capacity of the co-operative ginneries being adequate for this quantity. This resulted in the following percentages of the total purchases of seed cotton being allocated to co-operative ginneries during the 1962/63 season:—

<i>Zone</i>						<i>Percentage</i>
Mengo	...	...	...	...	...	15
Mubende	...	...	...	...	...	15
Busoga	...	...	...	...	...	35
Mbale	...	...	...	...	...	41
Lango	...	...	...	...	...	20
Bunyoro	...	...	...	...	...	50

The balance of the crop in each zone was shared on a normal basis between the private ginners.

Multiplication of New Strains of Cotton

28. Due to the very poor 1961/62 season and the resultant shortage of Phase I and Phase II seed, it was impossible to introduce new seed into each zone in the normal way. Many districts dressed and planted seed from their own previous year's production.

Cotton Seed Dressing

29. All seed used for planting in 1962, amounting to nearly 24,000 tons, was again treated against bacterial blight, using a copper fungicide. In order to prepare for the use of a mercurial seed dressing dust prototype automatic chemical dispensing and dust extraction equipment for fitting to the seed dressing drums was constructed in 1961 and tests were carried out; these have now proved satisfactory and all units will have been modified before the 1963/64 cotton season.

Cotton Spraying

30. Spraying of insecticide by farmers against spiny boll-worm and *Lygus* continued and approximately 111,200 acres were protected, compared with 16,000 acres in 1961. The economic advantage of spraying early planted cotton was again well demonstrated. Most progress was made in Busoga where about 35,000 acres were sprayed. From July onwards, the insecticide was issued free by Government.

Amalgamation of Cotton Zones

31. The North and South Teso cotton zones were amalgamated and the marketing of the 1962/63 crop was carried out in the amalgamated zone, which was known as the Teso Zone.

(b) Coffee

Bugisu Arabica 1961/62

32. Production consisted of 8,409 tons of parchment and 475 tons of "buni" purchased by the Bugisu Co-operative Union and 1,295 tons of parchment handled by the Bugisu Coffee Marketing Association. The total crop, amounting to 9,704 tons of parchment and 475 tons of "buni", was a record.

33. The average price paid to growers by the Union was Sh. 1/78 per lb. of parchment compared with Sh. 1/65 in 1960/61. That part of the crop purchased by the Union was milled in Mbale and auctioned in Nairobi, the average price realised being £283 10s. per ton f.o.r. Nairobi, compared with £286 in 1960/61 and £316 in 1959/60. Purchases by the Bugisu Coffee Marketing Association were exported as parchment.

Bugisu Arabica 1962/63

34. It was to be expected that following a record crop in the 1961/62 season, a smaller crop would follow in the 1962/63 season because of the normal biannual fluctuations. However, although weather conditions were suitable, a crop of only 5,500 tons was estimated because of poor ground maintenance

following the heavy rains of 1961 and bad pruning which adversely affected the health of the trees. In addition, the drive to improve the quality of the coffee met with little success as a result of many farmers' failure to improve their husbandry practices. Very many growers, however, took full advantage of the subsidy on coffee pulpers and drying trays.

35. The season opened slowly in late September as there was uncertainty regarding the initial price. The Bugisu Coffee Marketing Association which had entered the market since the previous year became particularly active latterly when it offered keen competition to the Bugisu Co-operative Union. This competition led to price fluctuations and a very serious decline in the quality of the crop.

36. Seed of improved coffee varieties was ordered from Kenya and planted at the Busulani Central Nursery for the replacement scheme. Over 140 private nurseries were also licensed to sell seedlings for gap filling.

37. The modified old type of pulper at Bugimotwa came into operation early in the marketing season but the Buluganya pulper did not operate because of the loss sustained in 1961/62. One central pulper operated in Bugisu District during the year as a part of the scheme to improve quality.

38. The spraying plan continued in Sebei and north Bugisu and some 7,700 acres were sprayed against Antestia and Lace-bug (*Habrochila ghesquierei*).

39. Details of crops produced in the last ten seasons are shown in the following table:—

TABLE B—BUGISU ARABICA COFFEE

Season	Production (parchment)	Estimated value to growers
	<i>Tons</i>	<i>£</i>
1952/53 ..	2,307	633,040
1953/54 ..	3,122	1,231,791
1954/55 ..	6,170	2,015,662
1955/56 ..	4,098	1,349,576*
1956/57 ..	5,175	1,420,353
1957/58 ..	4,805	1,198,602
1958/59 ..	4,912	764,072
1959/60 ..	5,791	1,013,722
1960/61 ..	5,149	972,623
1961/62 ..	9,704	1,935,827

* Includes value of 177 tons of "buni".

40. An outbreak of Coffee Berry Disease (C.B.D.) in Sebei, which may have a far-reaching effect on the Bugisu coffee industry, was confirmed.

Coffee other than Bugisu Arabica

41. The total production of coffee, excluding Bugisu Arabica and estate production, during the calendar year amounted to 100,352 tons of clean Robusta coffee and 3,884 tons of Arabica coffee produced in Buganda, Western and Northern Regions. Estate production during the 1961/62 season amounted to 6,506 tons of clean Robusta and 248 tons of clean Arabica of which 376 tons

of clean Robusta were produced by African-owned estates and the rest by non-African estates. The total value of coffee to African growers was £13,784,550. This includes the value of 376 tons of clean Robusta grown on African estates, estimated at £51,400. Together with £898,090 received by non-African estates, this brings the total income earned by coffee growers to £14,682,640.

42. The price of Robusta dry cherry from the last buying season of 1961 to the 8th January, 1962, was fifty cents per lb. During the buying season from the 22nd January, 1962 to the 17th June, 1962, it was sixty cents per lb. and from the 18th June, 1962, to the end of the year it was forty-eight cents per lb. The price paid per lb. for Arabica throughout the year was seventy-four cents for dry cherry, one shilling and sixty-four cents for rough-hulled and one shilling and seventy cents for parchment. The prices paid per lb. for Robusta, up to 8th January, 1962, were fifty cents for Kiboko (dried cherry), ninety-four cents for rough-hulled and eighty-four cents for parchment. From 22nd January to 17th June, dried cherry fetched sixty cents, rough-hulled one shilling and twelve cents and parchment one shilling. From the 18th June to the end of the year prices were: dried cherry, forty-eight cents; rough-hulled, ninety cents and parchment, eighty-two cents.

43. The processing of coffee was handled by 36 estate coffee factories (which are owned by Co-operatives and Associations of Growers), 14 curing works and 7 licensed scheduled hulleries. Eight of the curing works are African enterprises, four of which are operated by Co-operative Unions. Thirty-six Associations of Growers operated estate coffee factories during the year. All coffee, other than that produced by estate coffee factories, was sold to licensed buyers at markets situated throughout the producing areas or directly to the curing works or the licensed hulleries. The primary buyers disposed of their coffee to the curing works or hulleries and after preparation the coffee was auctioned in Kampala by the Coffee Marketing Board. Prices ranged between £125 and £156 and £188 and £241 per ton for Standard Robusta and Arabica Grade 30 respectively.

44. In Buganda established growers showed little desire to expand their acreage, but, with Departmental encouragement, concentrated principally on improving existing plots in order to get higher yields. As a result, it was possible to reduce the number of nurseries, with those retained being used mainly to supply replacement seedlings. A campaign was launched to improve quality by proper picking and improved methods of drying, and 3,756 coffee drying trays were bought by farmers. Efforts to improve quality were, however, hampered by keen competition between buyers who bought wet and musty coffee. Weeding and mulching were generally good. Some manuring was undertaken. The main failure was in persuading farmers to prune properly. No accurate figures of the acreage of coffee actually in bearing are available, but based on production of 100,000 tons and a planted acreage in 1958 of 440,000 acres, it would appear that the average yield of Robusta coffee in Buganda is about 500 lb. clean coffee per acre.

45. Spraying against Antestia with malathion continued in Toro, Kigezi and Ankole districts in the Western Region, where a total of 7,741 acres were sprayed.

46. Production figures by districts are given in Appendix IV (*b*) and details of the total production during the last twelve years are as follows:—

TABLE C—AFRICAN COFFEE PRODUCTION
(*Other than Bugisu Arabica and African Estates*)

Year	Cured coffee	Year	Cured coffee
	<i>Tons</i>		<i>Tons</i>
1951 ..	34,362	1957 ..	61,570
1952 ..	29,563	1958 ..	65,292
1953 ..	26,998	1959 ..	93,261
1954 ..	25,196	1960 ..	107,017
1955 ..	60,160	1961 ..	83,283
1956 ..	48,498	1962 ..	104,236

47. Six pulperies worked in the Arabica growing areas of the West Nile District, where only 101 tons of parchment were produced.

Estate Production

48. The following table shows the quantities and estimated values sold by estates (excluding Associations of Growers and Co-operatives) during the last twelve seasons:—

TABLE D—ESTATE COFFEE PRODUCTION (ROBUSTA)
(*Including African Estates*)

Season	Production	Estimated Gross Value
	<i>Tons</i>	<i>£</i>
1950/51 ..	3,846	940,504
1951/52 ..	4,851	1,425,669
1952/53 ..	5,921	1,846,697
1953/54 ..	5,277	2,100,993
1954/55 ..	7,730	1,944,790
1955/56 ..	8,941	2,235,250
1956/57 ..	11,010	2,587,350
1957/58 ..	12,543	3,198,465
1958/59 ..	7,882	1,596,972
1959/60 ..	4,728	650,072
1960/61 ..	3,572	432,212
1961/62 ..	6,505	891,210

Reorganisation of the Coffee Industry

49. The main objectives of Government's policy were examined in the light of Uganda's commitments as a member of the Inter-African Coffee Organisation and as a potential signatory to the International Coffee Agreement following close consultation with the industry. A Sessional Paper outlining plans for reorganisation was published.

Mustiness

50. The installation of dust extraction and suppressing equipment in coffee factories in an effort to reduce mustiness in Robusta coffee proceeded satisfactorily during the year.

Congo and Rwanda Coffee

51. A considerable tonnage of coffee was offered for sale by Congolese and Banyarwanda growers along the border with Toro and Kigezi. To ensure the coffee was not sold in Uganda and included against Uganda's quota under the International Coffee Agreement, four Consortia were set up, two each in Toro and Kigezi, to purchase the coffee in bond. The entry points were scheduled by the Customs and Excise Department. The amount of coffee handled by the Toro Consortia from January to December amounted to 927 tons of Robusta and 1,461 tons of Arabica, while the amount that came through the Kigezi Consortia from their formation in July to December amounted to 708 tons, mainly Arabica.

(c) Tobacco

Flue-cured

52. Production of this type of leaf is confined to West Nile, Acholi and Lango districts of the Northern Region and Kigezi District of the Western Region. It is produced under three different systems, namely:—

- (i) "Master Growers" who grow and cure tobacco under contract to the East African Tobacco Company,
- (ii) Green Leaf Growers who sell uncured leaf to the East African Tobacco Company for curing, and
- (iii) Independent Growers who grow and cure leaf for sale to East African Tobacco Company.

53. In West Nile, the crop yielded 932,000 lb. of cured leaf of which one-third was produced by "Master Growers" curing their own crop. The quality was very good and the average price per lb. obtained by "Master Growers" was Shs. 2/75. The number of "Master Growers" rose from 56 in 1961 to 691 in 1962. The total acreage planted was estimated at 970. The average return per acre for Green Leaf Growers and "Master Growers" was Shs. 962 and Shs. 2,135 respectively, while the average return per grower was Shs. 221 and Shs. 1,104 respectively.

54. In Acholi dry weather during the first three months of the year hindered progress in ridging which delayed transplanting of the seedlings from the seed-beds. The total production of cured leaf from the district was 304,000 lb. as compared with 394,624 lb. in 1961. The number of "Master Growers" rose from 297 in 1961 to 400 in 1962 and the number of Independent Growers was increased by one to three. The average return per acre from the sale of Green Leaf and Cured Leaf was Shs. 1,925 and Shs. 2,200 respectively.

55. The Ngai Group Farm, whose members are the only producers of flue-cured tobacco in Lango, planted 14 acres, from which they cured 2,708 lb. of saleable leaf, an average of 193 lb. cured leaf per acre.

56. Marketing of the 1961 autumn crop in Kigezi was completed in February 1962. This, with the 1962 spring crop of 270 acres, yielded 150,000 lb. cured leaf. Both crops were purchased as green leaf by the Kigezi Development Company. The prices to growers were 12, 8 and 3 cents per lb. for Grades I, II

and III respectively as in other districts. Planting of the autumn crop started in September and 299 acres were established.

57. The average yield of flue-cured tobacco for the four districts where the crop is grown was estimated to be 645 lb. per acre, compared with 503 lb. of cured leaf in 1961.

58. Full details of production of all districts during 1962 compared with 1961 are given below:—

TABLE E—FLUE-CURED TOBACCO PRODUCTION

District	ACREAGE		PRODUCTION (Cured leaf)	
	1961	1962	1961	1962
			<i>lb.</i>	<i>lb.</i>
West Nile ..	1,803	970	1,094,508	932,016
Acholi ..	894	540	394,624	303,887
Lango ..	13	14	3,901	2,708
Kigezi ..	641*	628†	207,100*	150,000†
TOTAL ..	3,351	2,152	1,700,133	1,388,611

* 1960 autumn crop and 1961 spring crop.

† 1961 autumn crop and 1962 spring crop.

Fire/Air-cured

59. The cultivation of this type of tobacco, which is best described as “Fire Assisted”, is confined to West Nile District.

60. This was an exceptionally good year for the crop as registration of growers went very smoothly and staff were successful in their efforts to improve quality, particularly in connection with reducing moisture content at sale, proper hand tying and grading. The average price of Shs. 1/10 per lb. paid to growers was the best ever recorded. Production figures were as follows:—

				<i>Total</i>
		<i>Price/lb.</i>		<i>Production</i>
<i>Grade</i>		<i>Shs.</i>		<i>Lb.</i>
Grade I	...	...	1/50	343,214
Grade II	...	...	1/00	406,773
Grade III	...	...	—/70	227,832
TOTAL				977,819

61. The total crop was, therefore, 977,819 lb. as compared with 527,047 lb. of cured leaf in 1961, and was worth £53,885 to the growers, this being double the income received in 1961.

Fire-cured

62. Seed sufficient to sow 9,681 beds (25'×3') was issued to growers in Bunyoro in January 1962. Weather conditions were favourable and germination was good, though dry conditions later set in and interfered with planting out. Eel-worm attack was less severe than in previous years. Eventually 4,855 acres

were planted and produced 2,174,929 lb. of cured leaf of all grades. The Bunyoro Growers Co-operative Union Limited entered the trade for the first time and purchased 100,000 lb. and Nurmohamed Jessa (Uganda) Ltd., purchased 154,064 lb. cured leaf at one market. All other purchases were made by Messrs. Edwards Goodwin Limited, acting as agents for East African Tobacco Company Ltd. There was an overall improvement in quality. Grades I, II and III represented 27, 51 and 22 per cent respectively of the total crop as compared with 20, 10 and 70 per cent in 1961. The crop realised £121,982 for the growers.

63. In Mubende District sowing commenced towards the end of January and continued until March. Germination was good and healthy seedlings were produced. Transplanting of the early sown seedbeds began at the end of March. The main transplanting took place in April and May. The acreage planted was 289 compared with 308 in 1961. The crop grew well. A total crop of 83,400 lb. was produced as compared with 101,653 lb. in 1961. Ten per cent was purchased as Grade I, 78 per cent as Grade II and 12 per cent as Grade III at prices of Shs. 1/50, Sh. 1 and cents 70 respectively, compared with 12, 1, 82 and 5 per cent purchased at prices of Shs. 1/50, Shs. 1/10 and cents 80 and 60 for Grades I, II, III and IV respectively in 1961. The crop realised £4,203.

64. Details of production in the last three years in Bunyoro and Mubende are given below:—

TABLE F—FIRE-CURED TOBACCO PRODUCTION

District	ACREAGE			PRODUCTION (Cured leaf)		
	1960	1961	1962	1960	1961	1962
Bunyoro ..	3,438	3,219	4,855	<i>lb.</i> 1,535,287	<i>lb.</i> 1,319,832	<i>lb.</i> 2,174,929
Mubende ..	212	308	289	63,003	101,653	83,400
TOTAL ..	3,650	3,527	5,144	1,598,290	1,421,485	2,258,329

Yields of fire-cured tobacco averaged 439 lb. cured leaf compared with 428 lb. in 1961.

Development of Permanent Markets

65. Three permanent markets were constructed in Mubende, at Namango, Kibale and Nanseke and these, together with the one at Kitoba in Bunyoro, operated satisfactorily. Work on an additional three markets in Bunyoro was started, but could not be completed in time for the marketing season.

(d) Oil Seeds

66. Output of seed from the 1961/62 cotton crop was 68,136 tons of which 44,301 tons were sold to local oil millers and exporters at an average price of Shs. 361 per ton. Planting needs accounted for the remaining 23,835 tons.

67. The acreage of groundnuts planted was 615,700 as compared with 556,000 in 1961. Statutory minimum prices to growers of 25 cents per pound unshelled and 40 cents per pound shelled were declared during August and the assistance of Co-operative Unions was enlisted to cope with the crop after the trade failed to enter the market at these prices when the season opened.

68. Production of sunflower in West Nile District declined. Sales of the crop amounted to only 95 tons compared with 300 tons in 1961.

69. Production of castor seed continued to decline. In the Western Region, 612 tons were bought for which growers received £15,680 compared with 540 tons valued at £17,330 in 1961. In Mubende 486 tons were purchased valued £14,094 compared with 551 tons valued at £21,599 in 1961. The export of the crop is being encouraged as there are indications that there will be a steadily increasing demand in the world market for some years to come.

70. There was a big decline in sales of shea butter nuts in Teso District where only 31 tons were sold compared with 264 tons sold in 1961.

(e) Maize

71. The acreage of maize increased in Buganda to 170,000. Much of the crop was consumed in the immature state but the marketable surplus was estimated at 519,000 bags, of which 53,000 bags were exported as grain and a further 79,000 bags as maize meal. Kampala trade prices ranged between -/07 and -/15 cents per lb. although in some parts of Buganda prices were at times as low as -/03 cents per lb. In Eastern Region supplies of maize were adequate throughout the year. Exports were not large enough to take off all the surplus and prices remained low once the main crop was harvested. It was estimated that 120,000 bags were sold in Busoga and 10,000 bags in Sebei.

(f) Tea

72. At the end of 1962, approximately 13,600 acres of tea were in bearing from which 13,876,370 lb. of made tea were produced compared with 11,278,158 lb. in 1961.

73. The Tea Outgrowers' Scheme which was started in 1961 made satisfactory progress. The total acreage of Outgrowers' tea amounted to 963, of which 792 were in Kigezi, Ankole and Toro. The demand from Outgrowers has increased but the acreage established during the year was limited by the number of stumps available for planting. The standard of husbandry of Outgrowers' tea was very good and maintenance on most plots has been excellent. The practice of bending bushes after the first pruning at 12" was continued and under this system it became obvious that light plucking could commence as early as two years after planting out.

(g) Sugar

74. Sugar production progressed satisfactorily. A total of 39,473 acres were under sugar-cane at the two estates which produce mill white sugar. Total production amounted to 104,300 tons compared with 95,500 tons in 1961. Exports to Kenya were 35,840 tons compared with 33,001 tons in 1961. There were no exports of sugar to Tanganyika. Ten tons were exported to the Congo.

(h) Cocoa

75. Further planting of cocoa took place in selected areas of Buganda, Eastern and Western Regions. The acreage planted was 64, bringing the total to date to 244, of which 176 are in Buganda. Planting continued to be restricted to Upper Amazon varieties. A number of trials were conducted to ascertain the best fermentation technique for small quantities under Uganda conditions. Samples of beans sent to Messrs. Cadbury-Fry Ltd., received satisfactory reports.

(i) Sisal

76. Production of sisal from the 6,000-acre estate near Masindi Port in the Western Region was 454 tons, valued at £36,402, compared with 710 tons valued at £64,790 in 1961.

(j) Minor Crops

77. In Buganda, the Vanilla Outgrowers' Scheme based on the Salama Estate of Agricultural Enterprises Ltd., entered its second year with 10 farmers who had planted 300 vines. By the end of the year the number of farmers in Buganda had increased to 13 and the number of vines had more than doubled to 736. Exports were lower than in the previous year due to ineffective pollination.

78. Interest in cardamoms, pepper, ginger and turmeric continued to increase and it is intended to expand these crops with a view to meeting the needs of the local market which at present imports most of its spice requirements. Two hundred and eight bags of locally produced ginger were bought in Kampala and 526 tons of chillies valued at £91,643 were exported.

V. AGRICULTURAL DEVELOPMENT AND EXTENSION WORK

(a) Soil Conservation

79. Much of the soil conservation work in the more mountainous parts of the country, and particularly on Mount Elgon and in Toro and Kigezi districts, consisted of repairing the damage suffered during the heavy rains of autumn 1961. The rains of 1962 were fairly evenly spread with the result that the existing conservation measures were adequate.

80. In the Western Region, and particularly in Ankole and Kigezi districts, mulching of permanent crops was well carried out and a very satisfactory measure of conservation established. In Buganda soil conservation work generally declined though Farmers Clubs and Progressive Farmers were responsible for 60 per cent of that done, and in Mpigi division they constructed 203 miles and in Mityana 106 miles of grass bunds. In the Eastern Region, little was done on a widespread basis but conservation measures on Progressive Farmers' farms were carried out well; there was a considerable amount of bunding in coffee and banana gardens and grass-wash stops were left between cultivated strips.

81. The annual and in some parts biannual burns of grasslands were light and erosion and water movement on hillside communal pastures was not so severe as usual.

82. Annual agricultural competitions between administrative divisions and between individual farmers were again keenly contested in all Regions. In judging holdings the main emphasis was placed on soil and water conservation and on indications that farmers were turning from subsistence to economic farming. In most areas, progress in soil conservation was not so great as in previous years because chiefs were preoccupied with administrative duties, notably preparation for parliamentary elections and Independence Celebrations. Where chiefs were keen, encouraging progress was achieved. Although, therefore, some progress in soil conservation was achieved, more work is still necessary in many areas before the whole soil and water conservation position can be said to be satisfactory.

(b) Agricultural Education

Main Farm Institutes

83. *Bukalasa and Arapai*—The minimum entry qualification for the three-year diploma course is the Cambridge School Certificate with two credits in Science subjects (excluding Health Science) and a pass in Mathematics. Normally students are expected to have studied Biology and either Physics with Chemistry or pure Chemistry. Applicants who hold a General Certificate in Education with "O" level passes in two Science subjects and the equivalent of School Certificate pass in Mathematics may be considered. A strong science background is essential for admission to the diploma course. The minimum standard of entry for the two-year certificate course is also Cambridge School Certificate but with a credit in only one Science subject (other than Health Science) and a pass in Mathematics. Applicants with a General Certificate in Education with similar subject qualifications may be considered.

84. At Bukalasa the first year of the Certificate Course started with a class of 28, including four from Zanzibar, of whom 17 completed the year. The second year started with 20 students of whom 15 completed the course.

85. Twelve students followed the third year departmental training course while a further four were given specialised training at Kawanda Research Station and at the Special Development Section, Namalere. At the end of the year, 14 were appointed as Agricultural Assistants on probation and two were appointed on temporary terms.

86. Nineteen students successfully completed the second year Teachers' Course.

87. Five students who had successfully completed the Certificate Course and served for a period in the field, were selected to undertake a one year course to qualify for a diploma: two were successful and were appointed Assistant Agricultural Officers. A further five certificate students were selected to undertake a similar course which will be completed in 1963. A Diploma Course was started at the end of September with 15 candidates, of whom

three were direct entrants, seven were selected after completing a portion of the first year of the certificate course at Bukalasa, and five from among the Arapai first year certificate students.

88. At Arapai twenty-three students started the first year of the Certificate Course but later five transferred to Bukalasa to undertake the Diploma Course. All but two of the twenty-seven students completing the Certificate Course were successful and twenty-one of them were appointed to the Department; of the remaining four, two joined the Prisons Department and two the East African Common Services Organization.

District Farm Institutes

89. The wide variety of agricultural and non-agricultural short courses offered at the five District Farm Institutes located in Kyagwe, Busoga, Bukedi, Lango and Toro were attended by 3,838 people as compared with 900 in 1961. Agricultural courses giving both general and specialised instruction predominated and attracted 2,762 people. On these courses particular attention was paid to the use of oxen in cultivation, row cropping and weeding, and the husbandry of the major crops of the area: publicity was also given to the Progressive Farmers' Subsidy and Loans Schemes. Visits to the holdings of Progressive Farmers continued to form an integral part of the courses. Refresher courses for Department staff were also arranged.

90. The building of Ankole and Masaka District Farm Institutes was nearly completed by the end of the year.

Farm Schools

91. Farm schools are operated by the Ministry of Education. Of the nine farm schools, five are in the Northern Region, two in the Eastern Region and one in the Western Region. They provide a two-year post-primary course in agriculture for boys whose aim is to take up farming and may be regarded as complementary to the District Farm Institutes, the basic difference being that whereas Institutes cater for the mainly practical instruction of adults on short courses, the farm schools cater for the teaching of students on a relatively long course which is both academic and practical.

92. Twenty students completed the course at the Aler Farm School in Lango and ten each at the Church of Uganda Farm School and the Verona Fathers Mission Farm School in Acholi. The farm schools at Koboko in West Nile, Kaabong in Karamoja, Bulindi in Bunyoro and Amucu in Teso operated satisfactorily during the year. At the Muljibhai Madhvani Farm School in Busoga there were 88 students, in attendance, of whom 43 successfully completed the course. Nyarushanzhe Catholic Mission Farm School in Kigezi District was opened with 24 students.

(c) Animal Husbandry and Pasture Work

93. The integration of livestock into a sound system of mixed farming in appropriate areas continued to be a major item of departmental policy. The fairly even spread of rainfall throughout the year and the consequent decrease in indiscriminate burning resulted in plenty of grass and water being available.

Progress towards individual herding was maintained and development was greatly assisted by the sale of 4,681 rolls of barbed wire to Progressive Farmers under the Agricultural Subsidy Scheme. In Busoga District alone, 1,049 rolls were sold. Farmers also purchased ox-carts, wheelbarrows and spray pumps, and built kraals, with assistance from the Subsidy Scheme. In Masaka Division 1,200 acres were fenced with wire while in Kigezi 63 holdings were totally enclosed and 139 partially enclosed, using mainly live hedges. The paddocks enclosed were generally on permanent pastures and in most cases improvement of the herbage was undertaken after fencing by the elimination of undesirable species such as *Cymbopogon afronardus* and *Acanthus*. In many areas grassland enclosure and improvement was accompanied by spraying to eliminate ticks, prior to the introduction of exotic cattle. In Masaka, a Dairy and Beef Farmers' Association, consisting of large and small farmers, was formed with the aim of increasing efficiency in mixed farming and stimulating interest in the integration of stock into the farming system.

94. A growing realisation among many cattle-owners, particularly in Buganda, of the large profits to be made from the high milk yield of exotic cattle and the increased yield of coffee and bananas obtainable after the application of farmyard manure has facilitated the efforts of the field staff to integrate live-stock into the farming system.

(d) Irrigation and Swamp Reclamation

General

95. Investigational work was continued in Ankole and Toro, in co-operation with the Water Development Department, to ascertain what crops can be grown successfully under irrigation.

Oruchinga Valley, Ankole

96. It was decided to close this small investigation after the harvesting of the 1962/63 cotton crop as a sufficiently large area of suitable land is not available for a major irrigation scheme in the area.

Nyakatonzi, Toro

97. It was decided to close the Nyakatonzi Irrigation Centre and concentrate all irrigation trials in Toro on the Mubuku/Sebwe scheme which is near Kasese and only five miles from Nyakatonzi.

Namalu, Karamoja

98. During the 1961 floods, most of the irrigation works were damaged. They have not been repaired.

Mubuku/Sebwe Scheme, Toro

99. This project consists of five 15-acre farms along an irrigation channel which is fed from the Sebwe River. The farms were handed over to selected tenants in 1961 with the object of ascertaining how successfully tenant-farmers can operate their holdings under the relatively rigid time-table necessary for the practice of irrigation. The farmers attained their full acreage under cultivation and produced cotton, groundnuts, maize, chillies, onions, garlic and food crops.

Progress was satisfactory and promising results are being obtained. The standing cotton and maize crops at the end of the year are expected to yield 1,300 lb./acre seed cotton and 2,800 lb./acre grain. The efficient use of tractors and machinery has been proved to be justified by increased crop yields and valuable investigational work has been undertaken on the best implements to be used for mechanical cultivation on irrigated land.

Sugar Estates

100. The use of overhead sprinkler irrigation for sugar-cane cultivation by commercial organisations was expanded and over 5,800 acres are now under irrigation by this method as compared with 4,000 in 1961.

Swamp Reclamation

101. Further swamp reclamation was carried out by the Water Development Department in Kigezi centred chiefly on the Kiruruma swamp where the channels made in 1961 were also maintained; by the end of the year 170 people had been allocated land in this swamp. All reclaimed land in Kiruruma and Kashambya swamps was fully utilised. A start was made in surveying the production potential of Kashambya swamp and the figures, when available, will provide data to establish whether there is any economic justification for swamp reclamation in Kigezi. Small areas were also privately drained by farmers without the help of the Water Development Department.

(e) Resettlement

102. Funds available for resettlement were drastically cut.

103. In Kigezi the Kihhi area was fully settled and assisted resettlement in Bwambara was discontinued. However, unassisted settlement continued on the fringe of both areas with 1,296 people moving to Kihhi and 25 families to Bwambara.

104. In Bunyoro the Kigumba area had 500 families, compared with 345 in 1961, and the Ntoma area 250 families, compared with 135 in 1961. The Kigumba settlers cultivated 588 acres of cotton and 1,000 acres of maize.

105. In Toro there was no assisted settlement in the Bigodi, Nsinde and Nkongora areas although some families settled in the area unaided. The Kahunge area was closed to aided settlement.

106. In Ankole, aided settlement continued in the Kakinga area where 97 families were settled, bringing the total to 220 families. At Nyansimbo there was no aided settlement but a reception camp for Rwanda refugees was started.

107. In the Oruchinga Refugees' settlement area some 12,000 Banyarwanda were resettled in 74 villages. Among these there are 36 of the original 50 families per camp site which were associated with 200 acres of land to be farmed communally. The communal farming was not successful and in July, the land was divided and each family allocated its own individual plots of land.

(f) Liaison with Local Governments

108. Close liaison was maintained with officers of Kingdom, Territorial and District Governments in all agricultural matters but due to widespread political activities throughout the year, agricultural matters tended to take a relatively minor place among the items which concerned District Legislatures and staff of Local Administrations.

(g) Mechanical Cultivation

Policy

109. The Department continued to use the Contract Hire Service to pioneer the development of mechanical cultivation where it was deemed desirable, with the intention that when farmers or other organisations in an area became capable of operating their own tractors and equipment the Department's tractors would be moved to other areas. In execution of this policy, tractor hire service units worked in Buganda, Acholi, Lango, Toro, Busoga and Bugisu.

Contract Hire Service

110. The total area cultivated was 6,413 acres compared with 8,187 acres in 1961 and 5,739 acres in 1960. After the very poor cotton crop of the 1961/62 season and the consequent lack of cash in the hands of farmers, it is not surprising that the acreage cultivated decreased. Comparative figures of acreages cultivated over the last three years by the main units are given below :—

TABLE G

Region or District	Years		
	1960	1961	1962
Acholi ..	1,375	1,244	975
Buganda ..	891	2,170	1,823
Lango ..	1,275	2,156	1,711
Toro ..	1,326	1,249	1,096
Busoga ..	454	872	588
TOTAL ..	5,321	7,691	6,193

111. The number of diesel tractors operating was 32, of which 14 were Ferguson 35, one Ferguson 65, eight Fordson Major and nine Fordson Dexta. Comparative tractor usage figures for 1960, 1961 and 1962 were 459, 654 and 541 hours per tractor respectively. Due to the reduction in hours of work there was an increase in operational and running costs per hour, which were Shs. 39/05 and Shs. 21/73 respectively, compared with operational costs of Shs. 40/12 and Shs. 32/22 for 1960 and 1961 respectively, and running costs of Shs. 23/76 and Shs. 20/67 for 1960 and 1961 respectively. Hire charges per acre remained at Shs. 45 for the first ploughing, Shs. 40 for second ploughing, Shs. 25 for disc harrowing, Shs. 15 for planting and weeding, and transport charges were Shs. 21 per hour. These charges included an element of subsidy. The pool of specialised equipment provided for hire by farmers owning tractors again proved popular.

Purchase of Tractors by Farmers

112. There were 83 private tractors, excluding those owned by estates, operating in Uganda. By far the greater part of their work was contract hire. As in the case of the tractor hire service very little beyond ploughing, harrowing and transport work was done. Regular advice and assistance with maintenance was given to private tractor owners by the Special Development Section.

Investigational Farms

113. Kigumba Farm in Bunyoro District continued as a fully mechanised farm run by the Special Development Section, primarily for the multiplication of pedigree cotton seed. The 1961/62 NC.61 crop gave a disappointing yield but the 1962/63 NC.62 crop got away to a good start and 180 acres planted. Germination and growth were good. The amount harvested by the end of the year was 182,542 lb. of seed cotton, which ensures an average yield of more than 1,100 lb. per acre.

114. It was decided that Kigumba would withdraw from the Eastern and Northern Regions Cattle Improvement Scheme because of the risk that the cattle at Kigumba might serve as a means whereby tsetse flies could spread southwards into south Bunyoro. Two hundred and two head of cattle were therefore sold, 21 slaughtered and 58 transferred to other departmental farms; 122 head of cattle remained on the farm at the end of the year. The sheep and pigs were also sold off.

Machinery and Testing Development

115. The Special Development Section continued to be responsible for testing and developing both tractor and ox-drawn implements and close liaison was maintained with the East African Tractor and Implement Testing Unit and the Tanganyika Agricultural Machinery Testing Unit.

116. Trials on the longevity of small tractors continued.

117. For the Tractor Hire Service, two modified John Deere 236 B Unit planters were mounted behind a Ferguson SKE potato ridger to produce a ridge planter for groundnuts on the irrigation plots at the Mubuku/Sebwe pilot scheme in Toro. Filters were introduced for the hydraulic lift pumps of the Massey Ferguson tractors and it is hoped that this will greatly reduce the damage caused to the pumps by the ingress of dirt through the external hydraulic connections. An extra grease point fitted to the steering column of Fordson Dextas was found to reduce the number of failures of the upper ball tract bearing.

118. In the development of ox-cultivation, considerable advances were achieved in the field application of ox-draught and valuable work was done by the ox-cultivation unit at Serere in testing equipment and implements imported from Europe and Asia. The ox-cultivation mobile demonstration unit has become a familiar sight in the Northern and Eastern Regions and has shown the great value of practical demonstration in getting policy over to the public. The most important progress in ox-cultivation is the development of the one man ox-control system which can replace the traditional method in which three

people are used. The development of suitable implements for this system of handling advanced considerably, and the design of the plough was near completion.

119. The Bentall seeder was sold to Progressive Farmers at approximately 50 per cent of the cost price under the Progressive Farmers' Credit and Subsidy Scheme. To increase the versatility of the seeder, clamps were developed for mounting it on ploughs and expanding cultivators of various makes. For hand operation a frame utilising a bicycle wheel and a modified opener of the type developed by the National Institute of Agricultural Engineering was designed and is now being produced by a local manufacturer.

120. An ox-drawn toolbar underwent extensive tests and has been found suitable for Uganda conditions. A toolbar made for East Africa by the National Institute of Agricultural Engineering is also being tested.

121. In co-operation with the Uganda Electricity Board, a small scale electrically operated drier was tested on a variety of crops.

122. Work is continuing on a small groundnut harvester and on the contractor's tool for bush clearing.

Tractor Training School

123. Two three-month courses for tractor drivers were held. A total of 31 students who attended driving courses passed and received their driving licences and certificates. One three-day course for District Agricultural Officers and Assistant Agricultural Officers, one fifteen-day course for Bukalasa Farm Institute students and six four-day courses on small tractors for farmers were also held.

Ox-drawn Equipment

124. The Department continued to expand the use of ox-drawn equipment to new areas and to widen the range of implements available by the inclusion of seeders and inter-row weeder.

125. In the Western Region, all districts continued to train oxen for demonstration purposes and also for farmers who offered untrained oxen in exchange. Response was much better than in 1961. Training of farmers and their sons continued. A very successful four-day course on ox-cultivation, held in Kigezi, was attended by all agricultural staff, many farmers and chiefs. It has been found in the Western Region that tsetse fly is a big limiting factor to the spread of ox-cultivation because suitable land is mostly in tsetse infested areas, where cattle cannot be kept except under prophylactics.

126. In the Eastern Region, all units continued to demonstrate the use of ox-implements. In addition, large-scale demonstrations were held with the help of Serere staff and many thousands of farmers were able to see the full range of ox-implements being recommended. The excellent work done in Teso during 1961 was followed up and 80 Todd Seeders were issued to sub-counties to be used by Progressive Farmers and Agricultural staff for demonstration, and over 4,000 plots were row-cropped.

127. In the Northern Region refresher courses on ox-cultivation were held for all agricultural field staff. A series of demonstrations were held in every

county in the Region; the attendances were very encouraging, varying from 100 to 3,000 people. Emphasis was on Polyculture equipment and Bentall seeders. Sales of ox-equipment expanded, notably in the latter part of the year.

128. In Buganda, very little interest was shown in the use of oxen except in Buruli and Bugerere counties.

129. The demand for ox-training in all areas has far outstripped the ability of the limited number of trained staff to cope. Hence, concentration has been on training field staff who are responsible for extension. All training has emphasised the use of the "Indian" or "one-man" handling method for oxen.

(h) Progressive Farmers

130. Departmental policy aims at developing a class of yeoman farmers as the spearhead of agricultural development. Progressive Farmers and their sons received priority on District Farm Institute courses and demonstrations were held on their farms. Progressive Farmers' competitions were held in most districts and are proving most useful. The Agricultural Subsidy Scheme and the Progressive Farmers' Loan Scheme continued during the year. The object of the Subsidy Scheme is to make available to as many Progressive Farmers as possible the implements and equipment they need, to adopt the advice of the Department, at a price they can afford. A wide range of agricultural equipment, was purchased under the Subsidy Scheme including 4,681 rolls of barbed wire, 6,435 small spraying pumps, 1,992 fencing posts, 5,373 coffee trays and 4 tractors. Sales of subsidised equipment would probably have been much higher had the 1961/62 cotton crop not been a failure. In the Eastern Region, where the widest use was made of the Subsidy Scheme, it is estimated that agricultural equipment to the value of Shs. 153,000 was purchased by farmers. The Progressive Farmers' Loan Scheme is designed to provide credit for farmers who are prepared to help themselves and who are willing to listen to and put into practice the advice given to them by the Department. Credit-worthiness is assessed on character, integrity and the farming ability of the individual farmer, together with the productive capacity of his farm and the improved farming practices being introduced. Farmers found repayments of large loans difficult mainly due to the failure of the 1961/62 cotton crop, but in general the response to both schemes was very encouraging.

131. Interest in farm planning was well maintained. In the Eastern Region about 60 plans were made, which brought the total number of farms now planned in that Region to about 150.

132. In Buganda, considerable interest continued to be shown in Farmers' Clubs. At the end of the year there were 231 clubs compared with 80 clubs at the end of 1961. Each club consisted of 20 to 30 active members.

VI. INVESTIGATIONS

133. The following is a brief report on the investigational work undertaken by the Research Division during the year. The full report is published as Part II of the Annual Report of the Department of Agriculture for 1962.

(a) General

Weather

134. Wet weather continued at Serere up to the end of 1961 and enabled some field cultivations to be done up to the second week of January. The soil then dried out until the main rains started in the third week of March. There were no "grass rains" in February. Rainfall in the last ten days of March amounted to 8 inches and a further 6 inches and 8 inches were recorded in April and May respectively. All crops, except finger millet, were planted early. It was particularly fortunate that all the farm cotton was well established before the third week in May when a sharp dry spell occurred which seriously delayed planting in the surrounding district. Nearly 10 inches of rain fell in 15 days in June, which was excellent for all crops. In July only $3\frac{1}{2}$ inches of rain was received; this enabled sorghum, maize, millet and groundnuts to be harvested under ideal conditions but caused a check in cotton growth. August and September were wet with excellent conditions for establishment and growth of the second rains' crops. Cotton picking commenced at the end of September under ideal dry conditions but was interrupted by frequent sharp showers in late October. The heaviest rain storm of the year occurred in November, producing $3\frac{1}{2}$ inches of rain and making a total for the month of 7 inches, which was very much higher than usual. Grass growth was thereby considerably prolonged, although December was a dry month. There was no shortage of pasture throughout the year due to the overall most satisfactory rainfall distribution. At Kawanda, the weather was good for crop growth during the year, the only really dry months being February (1.98 in.) and July (0.10 in.). The total annual rainfall was 55.4 inches, which was well above average.

Kawanda Farm

135. In the first rains' cropping, maize yielded over 2,000 lb. per acre of dried grain. Groundnuts, however, did not do well, producing only about 800 lb. per acre, and beans also produced only a mediocre crop, averaging 300 lb. per acre.

136. The second rains' harvest was delayed because of the continued damp weather. Maize and groundnut crops appeared promising and cotton harvesting was progressing satisfactorily. Cotton yields, although expected to be better than in 1961, may not be high due partly to an unexpected dry spell soon after planting and an extremely severe hailstorm which hit the main arable block on the southern end of the farm just before flowering time and partially stripped the plants.

137. It has been found that there are large variations in crop yields. This is considered to be evidence of the very low and variable state of fertility on the farm generally. In consequence it was decided that a fertilizer policy should be adopted. This is getting under way on both elephant grass and first and second rains maize, and as a result the grass particularly has shown considerable improvement in appearance, growth habit and speed of regeneration. Eventually it is hoped that a large tank will be installed at the new kraal/dairy installation, for the purpose of collecting liquid manure for use on grassland.

138. A new dairy unit has been constructed. This was finished during the first half of December, by the installation of a Fulwood high level 4-point milking unit. At the same time an adjacent building was modified and converted into a kraal to house part of an experiment on different systems of management for exotic dairy cattle, which is being run in conjunction with the East African Agriculture and Forestry Research Organisation. This experiment is aimed at finding the difference between two management treatments, namely, cattle kept outside in the field continuously, compared with cattle kept in the stall all the time. The first six pairs of twins arrived towards the end of the year and were allocated to their different treatments. Nine more pairs are expected early in 1963.

139. Following the drainage of a section of the swamp in 1961 and the erection of some small camber beds, cultivation of vegetables was attempted, but without any notable success. It is intended, however, to use a crawler tractor, with which to construct two large camber beds. Cultivation of vegetables will then be attempted on a large scale with the assistance of overhead irrigation.

140. The costings, projects and management farm made good progress during the year. A third Friesian x Guernsey was added to the unit. The two original cows gave over 1,000 gallons in their lactations. The broiler poultry unit showed a profit. The coffee was carrying a heavy crop at the end of the year, so heavy in fact that the bushes have generally suffered a severe setback. One acre of Arabica has been planted up, and to date the plants look vigorous. The cotton crop was not expected to yield well because of damage by hail. A number of minor crops such as onion, ginger, garlic and solanum potatoes were tried. Ginger was not successful, but good yields were obtained from onions and solanum potatoes. Garlic did not grow to the size common in southern Europe, but there were adequate supplies for the local market.

141. The fish tank has not been a success. The Israeli carp have not flourished and the tank has been drained and deepened and will be restocked.

142. A pair of oxen were trained on the Indian system, and are being used for inter-row cultivation of the arable crops. It is hoped that these will make a significant contribution towards reducing cultivation costs.

Serere Farm

143. The yields of crops have in many cases set new farm records, partly due to the favourable weather and partly due to efficient farm management which enabled full advantage to be taken of the season. Eighty acres of cotton on the main farm gave an average yield of 1,020 lb. per acre, and the highest yield was from a 3-acre field of Albar 5 MB which gave the record yield of 2,240 lb. per acre. This is the first time that an annual average of 1,000 lb. per acre has been achieved, despite the fact that all the cotton was under experiments, some of which included unsprayed treatments.

144. Bunch type groundnuts gave high yields averaging 2,060 lb. (in shell) per acre over several fields totalling 20 acres, in the first rains. In the second rains a half acre plot, planted on newly opened land, gave the surprising yield of 1,920 lb. per acre. A home-made tractor-mounted lifter, which was used

for the first time, reduced the labour required for lifting from ten to four man-days per acre.

145. A simple maize trial on a 10-acre field showed that 2 cwt. of single superphosphate, 2 cwt. of sulphate of ammonia and 1 cwt. of calcium ammonium nitrate per acre increased yield by 59 per cent and net return by 45 per cent. The farm's average yield for maize was 2,900 lb. grain per acre for a total of 15 acres scattered over different sites.

146. Finger millet yielded well, averaging 1,540 lb. grain per acre from 21 acres. The best yield on a field scale was 1,890 lb. grain per acre and a small experimental area yielded at the rate of 3,050 lb. grain per acre.

147. First rain sorghum yielded well, giving an average of 1,730 lb. of grain per acre. One $2\frac{1}{2}$ -acre field gave 2,200 lb. per acre.

148. The second rains' crops were disappointing. Cowpeas once again responded adversely to damp conditions during growth, and this year's crop was decimated at flowering by an attack of flower-eating insects. French beans suffered equally badly due to the wet conditions and yields of varieties ranged from 116 lb. per acre to 706 lb. per acre, the worst yields being obtained from the anthracnose-susceptible bush types.

149. Bulrush millet again proved to be a reliable second rains' grain crop. It is very cheap to grow, and appears to be a very good indicator of soil fertility treatments and valuable for test cropping. This year, 14 acres of bulrush millet averaged 1,440 lb. of grain per acre.

150. A eucalyptus plantation was established in order to supply both fence posts and firewood in the future. The plantation includes observation plots on methods of protecting transplants from termite damage with insecticides and will give an assessment of rate of growth of different eucalyptus varieties. The seedlings were planted out in May and averaged 9 ft. of growth before the end of the year.

151. A banana plantation containing 35 varieties of bananas of all types was established to facilitate study of varietal behaviour in the Serere environment, with special reference to yields, pests and diseases.

152. A great deal of development was carried out on station roads, fencing and drainage. The drainage will eventually convert a swamp area of 20-30 acres at the bottom of Central Farm, into productive pasture.

153. Lantana control work continued. Two hundred and fifty acres were sprayed with 2,4D which once again gave excellent control. There are now no massive concentrations of Lantana left, but constant vigilance and annual use of Knapsack Sprayers will be necessary in future to control reinfestation from beyond the farm boundaries.

154. The development of farm machinery has reduced costs of handling produce and machinery is now set up for threshing, cleaning and dressing crop and pasture seeds.

(b) Soil and Land Use Surveys

155. Soil surveys of the departmental stations at Serere, Bugusege and Kyembogo were completed. In addition survey work was carried out on estates belonging to Agricultural Enterprises Limited, at Bugambe, Kayonza and Musisi. Other estates visited for soil examination include Mwaro Estate, being developed by Bennett Farm Services, and Nakyasanja Estate.

156. Soils of two areas chosen as possible sites for the Arabica Coffee Research Station in Bugisu were examined and tested. On the basis of these findings the site at Buginyanya was eventually selected as being more suitable.

157. Further visits were made to the irrigation plots at Kasese to select a suitable site for extension of the irrigation trials to soil unit 2. At the request of the Senior Geologist a visit was made to Kamwenge to examine and discuss excavations that the Geological Department were opening during their geochemical prospecting over parts of south Kibale county.

158. Laboratory work consisted mainly of completing mineralogical studies of sand from selected Uganda soil samples sent to Cambridge for X-ray analysis of their clays.

159. The soils of Uganda were reclassified according to the scheme devised by D'Hoore for his African soils map and a map was produced which was included in the Uganda Atlas. This work ran concurrently with preparation of material for chapters in the revised edition of "Agriculture in Uganda" (Tothill) and rewording of Uganda Soil Survey memoirs for publication as a supplement to the *East African Agricultural and Forestry Journal*.

(c) Soil and Plant Chemistry—General

160. In the third cropping year of the experiment at Kawanda which is designed to measure the soil regenerative effects of various grass treatments, no significant treatment difference was found by the East African Agriculture and Forestry Research Organisation in the physical structure of the top soil as measured by spore space, percolation and rainfall acceptance determinations. There continued, however, to be large treatment effects on the yield of maize. All grass treatments significantly increased yields by 80 to 140 per cent over the continuously cropped control yield of 810 lb. grain per acre. The best treatment was, once again, the 3 years of elephant grass burnt on site twice a year.

161. The experiments with heavy phosphate treatments continued at Kawanda. Repeated dressings of 4 cwt. triple superphosphate had no significant effect on maize, no matter how applied (broadcast or placed or ringed around plots) and whether or not used in combination with farmyard manure or lime. Supplementary dressings of NKMg, however, increased cob yields approximately five-fold.

162. The permanent annual crop manurial experiments continued in Buganda, Western Region and West Nile District. Over the three years, maize, occasionally cotton and especially beans have responded to sulphate of ammonia; cotton and cereals have responded to triple superphosphate; tobacco and sweet

potatoes have responded to potash; and no crops have significantly benefited from applications of magnesium.

163. In a large trial on second year land at Serere the three major grain crops: maize, finger millet and sorghum, showed responses to applications of single superphosphate, but only maize responded to applications of nitrogen. The mean yields were very high. In another trial on land cultivated for from four to ten years, where the average yield was much lower, the yield of finger millet was increased 50 per cent by application of sulphate of ammonia and single superphosphate, both at 2 cwt. per acre.

164. In trials with groundnuts, yields were increased significantly by applications of lime at 1 ton per acre and single superphosphate at 300 lb. per acre. No response was obtained to applications of gypsum. Intra-row spacing treatments were included in one of the trials and considerable increases of yield attended the use of close spacing, but there were no interactions with fertilizer treatments. Counts of rosette-affected plants showed that phosphate and lime applications significantly reduced the incidence of rosette disease. Bulrush millet, sown on the fertilizer and spacing trial after the groundnut harvest, showed a significantly higher yield on the plots which had previously carried the close-spaced groundnuts. The bulrush millet responded also to the lime and phosphate residuals.

165. The effects of nitrogen, phosphorus and sulphur on cotton were measured in a trial which also included four spacing treatments. A large response to 40 lb. nitrogen per acre as sulphate of ammonia was obtained, whereas 80 lb. nitrogen tended to depress yield. The depressive effect of high rates of nitrogen was alleviated by simultaneous applications of phosphate and sulphur. The best combination increased yield by 59 per cent. Close spacing (2' x 6") was advantageous, but there were no significant interactions of spacing with fertilizer treatment.

(d) Pesticide Research

166. Commercial samples of Reglone, Gramoxone, Atrazine and Stam F.34 herbicides appeared to exert no appreciable control over *Oxalis latifolia*.

(e) Stored Products Pests

167. A pamphlet on the storage of agricultural produce was published. Work on the storage of three varieties of beans with gamma BHC dust was published. Collections of moth larvae have been started in an effort to obtain viruses for research on biological control of stored products moths.

(f) Chemical Analysis

168. Nearly 3,000 soil samples and 3,100 leaf samples were analysed during the year in addition to occasional miscellaneous determinations. Starch and soluble carbohydrates in coffee leaf were determined in two hundred experimental samples but did not appear to give useful information and these analyses have been discontinued.

(g) Crop Protection Machinery

169. The major project for the first half of the year was production of some fifty "Jones' Cotton Booms" for use on large-scale plantings in the isolated cotton seed production areas and other selected sites. These booms were designed by the Research Division and consist of a very light boom covering four lines of cotton, attached to a haversack hand-operated sprayer. Apart from the nozzles the entire structure was fabricated from locally available materials at a cost, excluding labour, of Shs. 127 a unit. Negotiations with a U.K. manufacturer and testing of various prototypes were concluded in December and resulted in a production model weighing only four and a quarter pounds, costing Shs. 87 delivered Kampala. The original fifty locally-made booms were supplied with "Ross" knapsack pumps both at less than cost from auctioned stock. All new production models will be fitted with the "Gloria" knapsack which will also replace the obsolete "Ross" as the coffee sprayer. The new "Jones' Boom" was displayed at the Nile Centenary Festival Exhibition.

(h) General Entomology

170. In co-operation with the entomologist from the Commonwealth Institute of Entomology, based at Muguga, light trapping for army-worm moths commenced at Serere. An interesting observation already made is that a few *Spodoptera exempta* are permanently present in the Serere environment. This may mean that army-worm outbreaks result from an upsurge in a small residual population and not from external invasion.

(i) Crop Investigations and Research (Annual Crops)

Maize and other Cereals

171. A number of newly introduced maize varieties from the districts and from other countries were planted in observation rows during the first and second rains. Many of these, including several from Israel, proved to be unsuitable for Uganda. Further single plant selections for yield characteristics were made from among existing varieties for back-crossing and subsequent varietal testing of the progenies.

172. Preliminary testing of newly-selected lines of maize was carried out at Bukalasa and Kawanda in the first and second rains, and routine District Variety Trials were planted throughout Uganda at 18 centres in the first rains and at 5 centres in the second rains. In the first rains' trials varieties KM/54, 5354 RRM/58 and BR 11 (a recent selection) yielded best on average. In a few centres a Kenya local variety was grown, but in general this did not yield as highly as the Uganda varieties.

173. Seed of six proven varieties was planted under controlled conditions at six different centres, for multiplication and ultimate distribution.

174. The East African Agriculture and Forestry Research Organisation's Sorghum Research Unit at Serere continued its work on sorghum improvement. Both wet seasons were good for sorghum growth but stem-borer attack in the second rains was serious in patches. A large variety collection was maintained and variety trials were carried out at Department of Agriculture sub-centres.

Varieties SB 65 and SB 68 show much promise. Hybridisation work continued (with emphasis on the production of local hybrids) and also the development of tetraploid lines. Sorghum out-yielded maize in Teso and the drier parts of Busoga and Buganda but maize yielded better in the wetter and more fertile areas of the country. Further progress was made in developing bird resistant varieties and in investigations of the stimulant from sorghum roots which germinates the seeds of the plant parasite *Striga*.

Beans

175. New introductions of *Phaseolus vulgaris* have included four varieties from Australia and a further 100 samples from different parts of Uganda. The latter contained 34 new types which have been added to the collection. This now numbers 211 types, which were planted in small plots during the second rains for observation and yield measurement. The breeding programme has continued to aim at the improvement of yields through the development of diseases-resistance. In pursuit of this aim a number of single plant selections have been made and some hybridisation has been carried out using selected varieties.

176. A number of recently selected diseases-resistant types have been planted in preliminary variety trials at Kawanda and Bukalasa. Some of these have performed sufficiently well for testing at district level. District Variety Trials were planted at two centres in the first rains and at seven centres in Buganda in the second rains, using five varieties. Results to date show that the highest yields (about 1,000 lb. per acre) were given by the varieties *Tanganyika Black* and No. 35, both semi-climbers. No. 35 is red-seeded and generally acceptable for local consumption, whereas *Tanganyika Black* is black-seeded and unpopular in some parts of Uganda. Among the bush types, No. 1/2, selected for its resistance to anthracnose, one of the major bean diseases, has conspicuously out-yielded the parent variety Banja, and has so far given higher yields than more recent selections.

177. Seed of varieties Mutike 4 and No. 35 were planted at six centres in Buganda for multiplication.

178. A spacing and variety trial, using varieties *Tanganyika Black* and No. 35, was planted at Kawanda and Bukalasa during the first rains. The spacings used were a single inter-row distance of 2 feet with five different intra-row spacings. The highest yields of clean seed were obtained from intra-row spacings of 6 inches and 12 inches within the row though treatment differences were small and non-significant. The spacing now considered best for both bush and semi-climbing beans is 2 feet between rows with seeds 6 inches apart in the row and one seed per hole. If good seed is used, this spacing corresponds to a seed-rate of 20-40 lb. per acre. Another spacing trial using variety *Tanganyika Black*, organised from Serere, was planted at Kawanda in the second rains.

179. Disease has been shown to be one of the most important factors limiting the yields of *Phaseolus* beans in Uganda, and detailed pathological studies are being carried out in conjunction with the breeding programme. Small observation plots (microplots) of all varieties in the Kawanda collection were planted at three centres (Kawanda, Serere and Rubare) in the first rains, and a smaller

number of these varieties at seven centres in the second rains. Varietal susceptibilities to six diseases in the different geographical areas were studied. Considering the four diseases of greatest economic importance (anthracnose, angular leaf spot, rust and bacterial blight), only three bush types and a few semi-climbers were not attacked, though a number of each habit showed tolerance. Very few varieties were substantially unaffected by at least one of the diseases.

180. All new introductions are now being studied systematically for disease susceptibilities. Among diseases recorded on beans may be mentioned an undescribed organism giving rise to white zonate leaf spots on *Phaseolus* beans and green grams, and a new strain of Anthracnose on a hitherto resistant variety of *Phaseolus vulgaris*.

181. A spraying trial was laid down at Kawanda on two varieties of beans, Mutike 4 and No. 35. A first rains' planting was severely attacked by *Nezara viridula* F. and *Acanthomia horrida* Germ. but no attack developed in the second rains on the spraying trial and there were no differences between the yields from sprayed and unsprayed plots of each variety.

182. At Rukoki a seed-dressing trial and spraying trial were laid down on the variety Tanganyika Black. The plots were irrigated. The dressings used were dieldrin and the systemic dressing Menazone compared with an undressed control, and although there were no significant differences, both treatments appeared to depress the yields below that of the control. The plots were split and half sprayed with gamma BHC at $\frac{1}{2}$ lb. per acre four times at fortnightly intervals but this treatment had no effect on the yields. Yields, however, were extremely good with an overall mean of 1,925 lb. threshed beans per acre.

Groundnuts

183. A similar seed dressing and BHC spray trial to that on beans was also conducted on irrigated groundnuts at Rukoki. Again there was no significant difference between the two dressings and the control, but both treatments increased the yield above the control level (the Menazone more than the dieldrin). Four gamma BHC sprays were applied as with the beans and these significantly increased the yield. There were no obvious entomological reasons for this increase in yield. The mean overall yield was 1,621 lb. of shelled groundnuts per acre.

184. Investigations continued on the agronomy and yield potential of varieties of groundnuts. Further introductions were received from other countries and the Serere collection now stands at 321 introductions from overseas and 273 from within Uganda. The Uganda accessions are on the whole referable to three or four types. The amount of variability within these types is being examined, in order to estimate the amount of improvement possible within local material. All the accessions are being screened in observation plots and trials, culminating in the series of variety trials held at 24 centres in Eastern and Northern Regions. Those tested in variety trials in 1962 were Serere BI, Red Valencia, Serere White Valencia, Mwitunde, Natal Common, and local Amasoga. The Amasoga spreading type yielded considerably less than the other four

varieties, as in the previous year, despite the achievement of satisfactory germination this time. Of the other four varieties Red and White Valencia and Natal Common gave similar yields, while the best yielder was Mwitunde. In 1961 Mwitunde yielded less than Red Valencia. This year there was a higher level of rosette disease in Eastern Region; Mwitunde appears to have some degree of field resistance to this, and in fact yielded progressively better than the other four varieties as the level of rosette infection at a centre rose.

185. One major aim of this programme is to produce a nut suitable for grading for export for the confectionery trade. Mwitunde is probably unsuitable for this, as it gives a very irregular sample and has a slightly bitter flavour. The best nut for this purpose still seems to be the *Red Valencia B1*, which was used in the Busoga Pilot Grading Scheme.

186. The recently imported varieties Mani Pintar and Bukene have shown considerable promise for high yields. Mani Pintar gave the best yield of any variety on Serere, at 3,438 lb. per acre (in shell); excellent yields with this variety have also been reported from Southern Rhodesia and West Africa.

187. The importance of planting at the break of the rains was shown once more. Sowings made in the third week of March yielded 2,000 lb. per acre, whereas later plantings gave progressively reduced yields with plots sown in mid-April giving only 1,250 lb. per acre. Once again it was shown that the higher the seed-rate, the greater the yield. The highest yield of Valencia variety B1 was obtained from a seed-rate of nearly 900,000 nuts per acre, i.e. 20 seeds per foot in rows one foot apart. Similar results were obtained with Natal Common and Etesot, but the variety Mwitunde differed and gave smaller yields when planted at seed-rates above 45,000 nuts per acre. These trials also confirmed that a good stand controls rosette; the important factor being not the distance between rows, but the plant spacing in the row. The optimum depth for planting was found to be 2 to 4 inches. The value of seed dressings against fungal attack at germination was again demonstrated; a seed dressing which controlled only soil pests gave no benefit.

188. A repetition of last year's spray trial using Bordeaux mixture and Sulphur to try to control Leaf Spot, showed no benefit from spraying, whereas last year spraying was beneficial. The lack of response was probably because the infection developed so late that it had little or no effect on yield.

189. Preliminary entomological investigations concerning the aphid vector of "rosette disease", *Aphis craccivora* Koch, were made during the year and interesting information obtained. The aphid breeds extensively on *Gliricidia* and *Cassia* sp. at Serere. No transfer of virus from host plants to groundnuts was achieved, although transfer of virus from infected to uninfected groundnut plants was easy. Differences in the morphology of the populations bred on alternate hosts and those reared on groundnuts were found.

Cotton

190. The E.C.G.C. Cotton breeder stationed at Serere continued his work on cotton breeding and agronomy. Trials which conducted at Serere and at the 24 district trial centres in the Northern and Eastern Regions have shown

once more that the current Albar selection has substantially out-yielded the current BC177 selection at present grown by farmers. The better bacterial blight resistance of Albar was again confirmed both under natural attacks in the district trials, and following artificial seed and leaf spray inoculations at Serere.

191. Spinning tests for quality assessment confirm the coarser nature of the fibre of Albar and that its staple length, if anything, is longer than that of BC 177.

192. Additional hybridisation programmes for naked seed, higher fibre strength, larger bolls, higher ginning outturn and maturity ranges, using introduced varieties, continue.

193. Trials combining planting date and spacing which were planted throughout the Northern and Eastern Regions have shown the benefit derived from early planting, i.e. early May. Irrespective of sowing date, there was a 5 per cent increase in yield by spacing at 2 ft. by $\frac{1}{2}$ ft., with one seed per hole, over 3 ft. by 1 ft. with two seeds per hole.

194. At Kawanda, however, spacing had no significant effect on yield, although the highest was obtained from the 3 ft. by $\frac{1}{2}$ ft., and the 2 ft. by $\frac{1}{2}$ ft., spacings. In this trial, six spacings were compared with and without insecticidal protection. Spraying significantly reduced the numbers of bug-damaged fruiting points shed and the amount of leaf damage and although it increased the yield the difference was not significant.

195. A trial to compare the effect of spraying on cotton planted on different dates was conducted at Kawanda. The yields meant very little in the disastrously wet season but the insect attack appeared to be normal. Leaf damage counts taken from each successive planting date over the spraying schedule showed that *Lygus vosseleri* (Popp) was common in May-June, very common in June-July and then dropped rapidly to a very low level in November-December. Counts of shed fruiting points taken over the same period showed that boll-worm was the primary cause of this shedding in the unsprayed plots; that it was very severe early in the year dropping to a low level later. Sheds showing bug damage were at a much lower level throughout and did not follow the same pattern as the leaf damage. This confirmed the view that *L. vosseleri* is not responsible for the mass of bug-damage sheds.

196. As reported last year, green mite, *Eotetranychus* sp. nr. *deflexus* (McG) was recorded for the first time. Work on this and the other two cotton mites, *Tetranychus telarius* (L.) and *Hemitarsonemus latus* (Banks), showed that the systemic pesticide Demethoate controlled both the *tetranychids* but had no effect on *H. latus*. DDT miscible liquid was confirmed as a control of *H. latus*.

197. A time of spraying trial was laid down at Bukalasa. Three routine spray schedules beginning at 5, 9 and 13 weeks were compared against an unsprayed control. Owing to the excessive rain the early crop did not open and this reduced the benefit from spraying. A count of large green bolls showed a potential crop of over 1,000 lb. of seed cotton an acre but only about half of this ever opened. The best spray treatment, that beginning at 9 weeks, gave 630 lb. seed cotton per acre against a control yield of 394 lb.

198. A trial was laid down at short notice on June-planted cotton at Ssege. The main purpose of the trial was to test a new four-row spraying boom developed in the Entomological Section and the four applications of DDT commenced late at 15 weeks from planting. Spraying gave a significant increase in yield of 160 lb. of seed cotton over the control yield of 500 lb. per acre.

199. Two spraying trials were laid down in the Western Region at the Rukoki experimental farm. The main trial was an irrigated spacing and spraying trial planted dry in late July 1961 and irrigated to promote germination and to maintain growth until the rains arrived in late August. The spacings were: 54 in. by 24 in., 54 in. by 12 in., 36 in. by 12 in. and 36 in. by 6 in. The rather unusual spacing of 54 in. was adopted to facilitate mechanical cultivation. Four applications of DDT were made at ten-day intervals beginning at nine weeks from planting. Counts of tea mite damage (*H. latus*) showed that there was significantly less on the sprayed plots. Spraying significantly increased the yields but spacing had no effect. The highest yields, however, came from the 54 in. by 12 in. spacing and were 1,197 sprayed an 845-lb. seed cotton per acre unsprayed.

200. The second trial compared spray schedules beginning at seven and nine weeks from planting against an unsprayed control and was on rain grown cotton planted in August. The early sprayed plots gave a mean yield of 1,153 lb. against 809 lb. seed cotton per acre in the control but this difference was not significant due to a high coefficient of variability.

201. Large-scale spraying trials with cotton were again the chief occupation of the Entomology Section at Serere. Fifty-five acres were used for various spray trials and the remaining 50 acres of cotton on the farm were given the standard spray by the staff of the section. In general, it was an exceptionally good year for cotton and a large amount of valuable information was gained.

202. In the early stages of growth much of the cotton suffered from aphid attack. Boll-worm, especially *Heliothis armigera* (Hub.), was very common and caused considerable damage to unsprayed plots; control of this pest with the DDT insecticides was excellent. *Earias*, mainly *E. biplaga* (boisd), was found throughout the season but the level of infestation of flowers and bolls was low. Early in the season this insect was common as a tip borer on some areas of the farm. *Taylorilygus* severely damaged unsprayed cotton on Central Farm. This year attack was late; symptoms on sprayed cotton were slight. *Helopeltis* was far commoner on Serere than for some years past and on some fields caused severe symptoms on unsprayed cotton both to the habit of the plant and to bolls. Late in the season, especially in the "top" crop, *Argyroploce* and *Platyhedra* were damaging. Stainers, mainly *Dysdercus nigrofasciatus* and *D. superstiosus* also caused damage to late maturing bolls.

203. A large trial which tested DDT, DDT mixtures, Toxaphene and BHC against cotton pests showed that DDT was far superior to Toxaphene and BHC under local conditions. The cost of adding Toxaphene and BHC to DDT would not prove economic. BHC used alone appeared to depress yields and this was correlated with increased populations of *Heliothis*. Average yields

following the use of insecticides containing DDT ranged from 1,000 to 1,062 lb. seed cotton per acre, from Toxaphene alone, 534 lb., from BHC alone, 74 lb. and from the non-sprayed plots 153 lb.

204. Tests of five 25 per cent DDT miscible liquids on sale in East Africa were carried out. All gave highly significant yield increases compared with unsprayed controls and none of them was superior to its competitors. None caused scorch or phytotoxic symptoms and all could therefore be allowed to compete on the market. Average yields ranged from 1,009 lb. to 1,074 lb. seed cotton per acre compared with an unsprayed treatment yield of 376 lb.

205. Trials testing several intervals of spraying with two commencement dates so far suggest that, on Serere, 15 or 20-day intervals combined with a 55-day commencement date gives the most satisfactory results.

206. District spraying trials were carried out at Ikulwe and Tororo, Labora and Abbi. This year has once again proved that early planting and spraying with DDT can easily double yields on Serere and increase yields in the districts considerably.

207. A great deal of information was obtained from a cotton pest survey carried out in the north and east of Uganda in November. The information obtained requires further study in the light of final yields returned from the districts. Calculations on the effect of spacing and of planting date on cotton yield are now being carried out at Kawanda.

Other Crops

208. Kawanda continued to act as an open quarantine station for new varieties of sugar-cane imported into East Africa. The collection of about 100 varieties was maintained and regular observations were taken for disease and vigour.

209. A trial of cassava varieties which will be harvested after different periods of growth was planted in August. It incorporated 15 varieties recently imported from Kenya. The varietal collection of sweet potatoes and bananas were transferred to Bukalasa. The collection of 15 varieties of soya beans was planted in maintenance plots. The collection of *Solanum* potatoes was planted out for maintenance and comparison of 9 varieties recently imported from Holland. A district variety trial with simsim, organised from Serere, was planted in the second rains. Collections of varieties of yams (*Dioscorea*), ginger, turmeric, sunflower, chick-pea, field-pea and cow-pea were maintained.

(j) Perennial Crops

PATHOLOGY

Arabica Coffee

210. Emphasis in the work on Coffee Rust (*Hemileia vastatrix*) has been on the differentiation of physiological races. The standard differentials are being established from cuttings received from Muguga and from seed sent directly from Mr. d'Oliveira of Portugal. In the meantime 7 races were identified using a routine laboratory technique on 250 accessions. Samples had been collected from the main arabica areas, and a race collection is being maintained.

211. The cumulative results of the work on rust to date emphasise the importance of seeking genetic tolerance rather than resistance.

212. Spraying trials using 0.5 per cent copper as cuprous oxide against *Hemileia* gave very promising results. In the Eastern Region, the 1961 high-volume sprays stimulated abundant flowering at the start of 1962. The crop harvested from plots receiving four sprays in 1961 and four in 1962 was ten times greater than that from the unsprayed control.

213. Coffee Berry Disease is present in Kenya, the Congo Republic and the Republics of Rwanda and Burundi and this disease has been reported on Arabica coffee in Bugisu, Sebei and Kigezi. A survey of the distribution of this disease in all the Arabica coffee growing areas has been initiated, and efforts are being made to control its spread.

214. Coffee leaf scorch is a condition of widespread occurrence in Uganda but it is not of great importance. The causal organism is *Ascochyta tarda*.

ENTOMOLOGY

215. Field counts of Lace-Bug (*Habrochila ghesquierei*) are still continuing in an effort to find the reason for outbreaks and the optimum time for spraying. A trial was laid down in an area infested by antestia to compare a DDT spray, a malathion spray, and a mixture of DDT and malathion; none of these treatments gave a large increase of lace-bug subsequent to spraying. This is contrary to opinion in Kenya where it is believed that sprays of DDT do lead to outbreaks of lace-bug on coffee.

216. Farmers' coffee near Bugusege Experiment Station has again been dusted with 2.5 per cent aldrin and 2.5 per cent dieldrin dusts to control coffee-berry borer (*Stephanoderes hampei*). In contrast to last year, these insecticides did not appear to be very effective this year. This may be due to the low standard of cultivation and of crop hygiene in these fields.

217. Damage by both white stem borer *Bixadus serricola* and the yellow headed stem borer *Dirphya* sp. has increased. Both these pests can however be controlled by the use of dieldrin. "Cutworms", which proved to be the larvæ of chafer beetles (*Family Scarabaeidae*), were killed in a coffee nursery by using 2.5 per cent aldrin dust.

218. Parchment from coffee trees which had been sprayed with lindane (gamma isomer BHC) was submitted to several liquorers. One liquorer gave a clean picture of the taints caused by these insecticides and he showed that:—

(a) A single application of 0.21–0.25 grammes gamma BHC per tree did not cause taint.

(b) When this application was followed by another in four weeks' time a bricky flavour developed.

219. Although lindane would be an extremely useful insecticide for coffee, the risk of getting taints from it precludes its use.

220. A new technique of spraying is now being used with the Motoblo sprayers. Instead of the insecticides being mixed in 15 gallons of water per

acre of 1,000 trees, 24 gallons are now used. The top of the tree is sprayed first, and after reaching the bottom spraying is continued back to the top again; this ensures an even coverage.

221. There is a need for a cheap machine which can be used by the individual farmer. Tests were carried out by the Senior Field Officer and he found the cotton pump (Plantector) gave a good deposit on coffee, if used with a long lance kit. The main disadvantage is that it requires two people to operate it.

222. An experiment with urea and malathion sprays at Kawanda indicated that a urea concentration of 60 per cent (i.e. 60g. to 100ml. water) did not lower the malathion's effectiveness in killing *antestia*.

Robusta Coffee

AGRONOMY

223. Profitable responses have been obtained from the use of nitrogenous fertilizers. The optimum rate of application is about 2 cwt. of urea or its equivalent per acre. A response of sixteen per cent has been obtained from superphosphate in the presence of nitrogen. An experiment is planned which will give further information regarding rates of application and profitability of phosphate fertilizers. Magnesium fertilizers have consistently given no responses both at Kawanda and Kituza.

224. Complete clean weeding whether performed by hand labour or with machinery results in a yield increase of 3.7 cwt. clean coffee per acre when compared with a cover either of natural weed species or of sweet potatoes. In order to reduce the costs associated with clean weeding the following sequence of operations has been introduced and has been found to result in a satisfactory degree of weed control:—

Early January	...	...	Slash
Early March	...	...	Slash
Late April/early May	...	...	Cultivate
June	...	...	Spray*
Late July	...	...	Cultivate
Late September	...	...	Slash and ring weed
Early November	...	...	Cultivate

*A spot application of "Delapon" to control couch if necessary.

BREEDING

225. A paper has been prepared describing the breeding programme of the past 50 years. In summary, improvement commenced with the selection of the erect-type Toro No. 9 in 1916. The bold bean of this tree was dominant in the succeeding generations which served for seed production for many years. Later, mother trees were selected from the heterogeneous population of cultivated plants, most attention being focused upon the Nganda type, a form easily trained into a spreading bush. This is a growth habit tolerant of low cultural conditions.

226. At Kawanda, open and self-pollinated progenies exist, from both original field selections and from recurrent selections at the Kampala plantation. The superior individuals in these progenies have been used for seed supplies. In 1952 productivity indices were introduced and only the best phenotypes retained. These have been clonally propagated, and are now being evaluated in five trials, each of 16–20 replications. The selection of mother clones adapted to each specific environment is based upon yield and resistance to Red Blister Disease.

227. It is planned to treat each trial as a polycross nursery in which the desirable phenotypes can freely interpollinate. Polycross progeny tests will detect the genotypes of good general combining ability.

228. In 1962 the Kawanda clonal trial was prepared as a polycross nursery by stumping unwanted clones prior to anthesis. This left five parent clones. A second nursery of nine clones has been similarly prepared on the site of the 1935 erect-type progeny-field which, since culling in 1952, has been interplanted with clones of selected trees. Both nurseries have been isolated from contaminant pollen by stumping all neighbouring coffee. Pair-crosses are planned between the five clones in the first nursery; ignoring reciprocal crosses, ten hybrids will be produced in an immediate search for high specific combining ability.

PATHOLOGY

229. Red Blister Disease occurs mainly on Robusta coffee in Buganda and parts of Busoga and Ankole. It gives rise to reddish coloured blisters on the green cherry leading to a reduction in quality. Evidence has been obtained from laboratory investigations that the causal organism is *Cercospora coffeicola*. A survey of the distribution of the disease is being carried out by district staff.

230. The three 1961 spraying trials at Kituza, to control Red Blister Disease, have continued without change of treatments. Preliminary disease assessments show that four sprays of 0.25 per cent copper completely control the disease. 0.5 per cent copper completely eliminated the disease compared with a 4 per cent infection for 0.1 per cent copper. As in the previous year, cuprous oxide and copper oxychloride were equally efficacious.

231. The Uganda Company were concerned with the amount of infection on one of their estates, and spraying trials were commenced to learn more of the epidemiology of the disease, and also to test the possibility of control using low-volume sprays.

232. Problems of microbiological activity and pest infestation in connection with the prospects of bulk-storing Robusta coffee have been considered. An effort was made during the year to reduce mustiness by implementing the recommendations of the Department, but in addition, more positive attempts to tackle this problem were started. Ultra-violet light treatment of dry-processed coffee is being tested as a method of reducing the load of storage micro-organisms. This is preferred to mechanical cleaning.

PHYSIOLOGY

233. Significant relationships have been found between (a) the yields of coffee and the logarithm of the nitrogen content of leaf samples and (b) the increase in yield following the application of nitrogenous fertilizers and the reciprocal of the nitrogen content of leaf samples.

234. A series of critical values for leaf nitrogen contents has been completed which takes account of the cost of the fertilizer in relation to the value of the crop and the expected rainfall at the time of the main flowering.

235. A map has been prepared showing the distribution of rainfall in Mengo and Mubende districts during the months of December, January and February; since it had previously been found that the amount of rain falling during this period critically influenced the yield of Robusta coffee.

236. It is noteworthy that the areas in Mengo in which coffee is grown as a major and as a minor cash crop received more than seven and five inches of rain during these months respectively.

237. Many observations have accumulated on the relationships between basal stem diameter and the weight of stem, primaries on the stem and leaves and cherries on the primary. It is hoped that upon analysis a suitable method for the measurement of growth may be evolved.

238. The superimposed nitrogen x mulch treatments on the trees of the clonal trials at Kakumiro, Nakabango and Namyoya have been severely depleted due to the destruction of clones susceptible to Red Blister Disease. It is intended however, to continue observations.

239. The recording of the trial comparing the effect of different levels of mulch and potash fertilizer at Kituza continues and no change in relative growth pattern exists. However, those trees receiving all the treatments at the highest levels now appear crowded and this may affect future cropping.

PROCESSING

240. Twenty tons of coffee sent in by the Coffee Marketing Board from various mills in Buganda were graded to ascertain the percentage of the crop retained by screens of different sizes. The coffee was graded into all sizes from screen 17 down to screen 10. The mean results from the grading of these 20 tons are shown in the following table. It should also be noted that this coffee was obviously from badly dried and prepared cherry, resulting in a high percentage of discoloured beans which cannot be removed by normal processing.

Screen size		Percentage of Crop before Catadoring	Percentage Defectives
17	..	26.45%	7.70%
16	..	25.80%	10.48%
15	..	23.63%	11.20%
14	..	17.52%	11.41%
10	..	6.63%	21.70%

241. It has already been shown last year that the picking of green and unripe cherry reduces the percentage of good coffee retained by screen 17 by approximately 15 per cent and also greatly increases the percentage of

defectives. Bad picking and drying by the farmers, and bad buying by the mills are the two main factors that lower the quality of Uganda's coffee.

242. A test carried out to check the accuracy of the grading screens on the Paul Kaack, gave results which are well within the limits set by the Ivory Coast.

243. A number of coffee drying experiments were carried out using a modified version of a small electric drier developed at the Empire Cotton Growing Corporation Station at Namulonge. Results were as follows:—

Type of coffee dried	Quantity dried	Time taken to dry to 12-13% moisture content	Cost of producing one ton of dried coffee with electricity at, say, 10 cents (E.A.) per unit
	<i>Lb.</i>	<i>Hours</i>	<i>Shs. cts.</i>
Fresh cherry ..	120	60	215 04
Wet parchment ..	100	36	115 80
Clean coffee at 15% moisture content	150	3½	4 56

244. All liquoring reports of the above samples were satisfactory, but cold air should be blown through the coffee after drying otherwise a fruity smell develops.

245. It should be emphasised that it is not an economic proposition to dry fresh cherry artificially. It is much better to leave it to dry in the sun to under 20 per cent moisture content and then finish it off in the drier, the cost is then reduced from Shs. 215/04 per ton down to Shs. 30/60 per ton. The cost of drying clean coffee should be of interest to the Coffee Industry as it was much lower than anticipated. The sum of Shs. 4/56 per ton for a moisture content reduction of 2 per cent should prove to be economic.

246. Two experiments to check the extent of moisture uptake by clean coffee in sealed and unsealed bins have been started. After two weeks' storage in unsealed bins outside in damp weather there was no evidence of any noticeable moisture uptake. The experiment will continue for a few months.

247. A number of new fairly large pulperies have been inspected and are now in operation and a successful siphon type cherry feed for small hand or engine-driven single disc pulpers has now been developed.

248. Work has commenced on the extension of the Namalere Coffee Factory to enlarge the clean coffee store and house the Coffee Marketing Board's experimental storage silos.

Cocoa

249. Measurements carried out on 85 trees of 20 months' age showed that the total dry weight of a tree was correlated with the cube of the stem diameter at the collar. Using this latter as a measure of tree size, a trial with Upper Amazon cocoa planted in either 2-ft. cube holes or smaller holes as used in West Africa has shown that the larger holes give increased growth of the order of 20 per cent at 12 months, 18 per cent at 18 months and 8 per cent at 24 months. Observations during the first year of cocoa underplanted in 37-year-old Robusta coffee showed that, provided a top dressing of nitrogen was applied, the growth was comparable to that in forest plantings. Measurements of soil moisture indicate that Albizzia shade competes seriously with cocoa for moisture.

250. The Upper Amazon hybrids planted in 1956 at Kituza seem to have their main flowering in November-January with possibly a fly crop flowering in May-July, although some trees flower and some pods are set throughout the year.

251. Growth in most of the Upper Amazon variety trials is promising with some trees setting pods after 18 months in the field. Observations at Kituza indicate that vegetative growth after 6 months from seed may be a sufficiently good guide to future yields for it to be used in selecting planting material.

252. Trials have shown that more than 100 lb. wet weight of beans are necessary for satisfactory fermentation, while 300 to 400 lb. are advisable to ensure a good product. Sun-drying of fermented beans is not easily achieved in the cocoa-growing areas of Uganda and artificial drying may be necessary.

(k) Pasture Agronomy

253. Investigations at Serere continued to be largely based on the species *Hyparrhenia rufa*, *Panicum maximum*, *Centrosema pubescens* and *Stylosanthes gracilis* and development work on seed production of these species made further headway. Twenty-one thousand pounds of pasture seed were distributed to over 50 sites scattered throughout Uganda, for sowing on a total of 620 acres. The major demand is still from Teso and Bukedi districts, while a growing market in Mengo District reflects the stimulus provided by the development there of a dairy industry based on exotic cattle.

254. The purity of "natural" seed bought from local residents near Serere is extremely low, hence the development, in the latter part of the year, of seed production on the farm. Harvesting from 12 acres of *Gola Hyparrhenia* and 7 acres of *Likoni Guinea* grass was achieved. Seed yields were encouraging, especially from plots which had received nitrogen fertilizer; 3 to 4 harvests of Guinea grass should be obtained per year. On some fields at Serere the practice of taking a seed crop in the first year of the ley has been adopted. Harvesting costs by hand methods (on "task" work) average 20-25 cents per pound.

255. One newly acquired pasture legume *Phaseolus atropurpureus* (Siratro) appears outstanding among new introductions.

256. Further evidence was obtained on the effect of too frequent defoliation of pasture grasses in reducing yield. Rotational management of pastures utilized by young Zebu cattle should allow the recovery periods between grazings of 6-9 weeks if near-complete defoliation takes place at each grazing. This is the maximum period for pasture growth before protein content becomes nutritionally limiting. The shorter period (6 weeks) is necessary at seasons of rapid pasture growth.

257. Last year it was reported that the yields of cotton following *Stylosanthes gracilis* were depressed and this was thought to be due to the effect of too much legume nitrogen in an exceptionally wet season. This depression in yield was repeated in a second cotton crop in 1962 and also in sorghum and groundnuts. Nutritional and soil structural effects are possible explanations, but there is increasing evidence that a phytotoxin accumulates

in a soil in which *Stylosanthes* is grown and that this persists for some time. The yields of the third test crops (bulrush millet and beans) in this series of trials were increased due to the pasture legume which suggests that the "depressant" had by then disappeared and that some nitrogen benefit derived from the pasture legume still persisted.

258. Results to date indicate that an efficient means of improving soil fertility may be through the use of phosphatic and sulphur-containing fertilizers on grass-legume leys in order to remedy the major nutrient deficiencies. Increased attention is being paid to this idea in the soil fertility research programme.

259. Large grazing trials at Serere occupying a total of 50 acres have measured the value of various pastures in increasing animal production. Among techniques for evaluating pastures in terms of liveweight gain, a Latin Square change-over design and Randomised Blocks with fixed and variable stocking rates and "Tester" and "Filler" techniques were studied. These trials have indicated that it is possible to produce over 200 lb. liveweight gain per acre per annum from an unfertilized grass-legume pasture which carried a fixed stocking-rate of one small (400-700 lb.) East African Zebu beast per acre throughout the year. This production can be increased to 300 lb. gain per acre per annum using a variable stocking-rate and inorganic fertilizers have increased production to 450 lb. per acre per annum.

260. Improved liveweight gains have been recorded from cattle grazing grass-legume swards compared to those grazing pure grass swards. In the first year after planting the pasture the benefit is small, of the order of 5-10 per cent. During the second year it increases to 20-25 per cent and in the third year exceeds 30 per cent. Under intensive grazing the grass in most unfertilized pastures deteriorates badly after two years and the legume becomes more dominant. This is particularly the case with Guinea grass, though *Hyparrhenia rufa* persists better than most grasses on the poorer Serere soils. *Stylosanthes gracilis* grows more vigorously than *Centrosema pubescens* on these soils, though differences between them, in animal production, have not been measurable so far.

261. In a grazing trial with grass and grass-legume leys, fertilizer application had large effects on dry matter production and crude protein content. Grass plus legume with no fertilizer proved better than grass with high levels of applied nitrogen, and the effect of legume was further increased by applications of phosphatic and sulphur-containing fertilizers.

262. Investigation into the management and yields of elephant grass and short grass leys and their effects on soil fertility were continued at Kawanda. A total of nine trials on elephant grass and seven trials on short grasses are in progress at Kawanda, and one district trial on elephant grass in Busoga. Nine of these were planted during 1962.

263. Final sample cuts and observations were taken on three elephant grass trials planted in 1959, preparatory to test cropping. No very great differences in gross yields have been observed between the various treatments in these trials. Approximately half the total yield for three-and-a-half years was given

during the first year of sampling, at a rate of 22 to 45 tons per acre per annum, without fertilizers. Yields then declined very sharply to a level of 5–15 tons per acre per annum which was maintained steadily to the end of the cutting-period of the trials.

264. Studies of the results are still in progress but the following features of interest may be mentioned, referring only to gross (stems and leaves together) fresh-weight yields:—

(a) Highest yields have been given from cutting at a height of 4–5 feet rather than at various time intervals.

(b) Yields on grazed plots have been at least as high as on either cut or cut-and-mulched plots.

(c) Stands of elephant grass have benefited from being allowed to remain uncut during either the dry season or the wet season.

(d) In a district variety trial at Nakabango in Busoga District, five varieties of elephant grass have out-yielded a local type but have differed little among themselves. After two complete years of cutting the trial has yielded at a rate of 50 tons per acre per annum gross fresh-weight, without fertilizer, but clean weeded. This rate of production has been maintained for both the first and second years, with only a small decline in yielding capacity during the second year.

(e) In a recently planted variety trial at Kawanda, the highest yields of green leaf have so far been given by the varieties Congo, Tanganyika and Kw. 16.

(f) The production, longevity and vigour of elephant grass appears to be very much a function of the amounts of weed present.

(g) Attempts to replace weeds by suitable sown legumes have given beneficial results. Very marked responses in appearance and yield have been produced on a number of experimental grass plots following the use of nitrogenous fertilizers, and their application has now been incorporated into general farm practice.

(1) Livestock

265. At Serere excellent liveweight gains were obtained throughout the year and new upper limits have been set for all classes of stock.

266. The Serere herd had increased by the end of the year to 576 head, and all growth rates were excellent. The record cattle production can be attributed to a favourable season for pasture growth, the increased area of available grazing, the improved quality of the leys, the more liberal distribution of water-points and the improved quality of cattle achieved by careful selection. Few lactations were completed. This reflects the severity of the effect of the outbreak of contagious abortion last year. Normal completed lactations averaged 1,476 lb. in 479 days, on a basis of once-a-day milking, which is the highest recorded at Serere since this system was adopted. This is most encouraging since there has recently been very little selection pressure on the basis of milk production and also because these yields have been achieved on an all-grass diet, at a level of management well within the reach of any progressive farmer.

267. The breeding programme to improve the beef potential of local small East African Zebu cattle continued. Sixty-four heifers were purchased from the Kyoga peninsula of Lango District which it is hoped will increase the genetic variability of the herd and also increase the speed of cattle improvement through increasing herd numbers.

268. It was necessary to remove all cattle from Kigumba Farm, Bunyoro, due to re-invasion by tsetse fly. Plans were made to clear the "bush" at Ngetta, Lango, and develop this farm into one of the main breeding stations.

269. One huge 1,250-lb. bull, Onorowici, produced outstanding progeny and is being mated to the best Serere cows. Calfhood vaccination with Strain 519 has cleared up most of the abortion trouble reported last year.

270. The experiment to measure the potential of large East African Boran cattle under conditions practicable to a progressive farmer reached an interesting stage. The last batch of heifers imported from Kenya gained artificial immunity to East Coast Fever (E.C.F.) using Aurofac. A 19 per cent mortality, mainly due to E.C.F. was recorded during the first six months after their arrival but mortality increased to 36 per cent later, due to infections by the skin disease, *Streptothricosis*. Some animals are extremely susceptible to this disease and in spite of treatment they lost condition and had to be slaughtered. The survivors of this disease are presumed to be comparatively resistant to its effects. These imported Boran heifers grew 44 per cent faster than their small East African contemporaries and are going to the bull at 700 lb. at less than 30 months old compared with a weight of 550 lb. for their local contemporaries.

271. The performance of Boran calves is still difficult to assess due to the small number born so far, the situation being aggravated by the fact that the best Boran bull proved to be infertile. It is probable that five pure Boran calves have developed a resistance to E.C.F., and this represents a 50 per cent survival rate (Brucellosis-positive animals being excluded from this number). Two of the survivors are from a single dam. It is possible that resistance to E.C.F. is heritable and if this is so the survivors are very valuable. The weaned home-bred Boran stock are growing faster than their contemporaries.

272. The main events at Kawanda have been the completion of the Jersey/Nganda crossing scheme programme and the start of a new experiment in conjunction with the East African Agriculture and Forestry Research Organisation to measure the response in terms of milk and butterfat production of European grade dairy cattle to two different types of management and feeding regime—stall-fed indoors and grazing outdoors. The Jersey grade herd continues to flourish.

VII. STAFF

273. The staff position was chiefly influenced by the achievement of independence by Uganda and the changes that came with it. A scheme was introduced whereby expatriate officers could retire with compensation for loss of career and eighteen officers decided to retire. In a number of cases Ugandan officers were promoted to replace them and this together with the award of scholarships for training courses overseas caused many vacancies to arise in the Agricultural Officer and Assistant Agricultural Officer cadres.

274. As Bukalasa Farm Institute was not turning out a sufficient number of diplomates for appointment as Assistant Agricultural Officers, it was found necessary to continue recruitment of expatriate Assistant Agricultural Officers and thirty-two officers were recruited on contract terms.

275. The eighteen officers who retired under the Compensation Scheme include the Director of Agriculture, Mr. Edwards Williams, O.B.E., who had seen service in Uganda dating back to 1935, and Mr. G. D. Badger, Assistant Director of Agriculture, who had served continuously in Uganda from 1938. Mr. Williams was replaced by Mr. W. V. Rose who was previously the Chief Research Officer in the Department.

276. Mr. H. R. Berunga, M.B.E., was promoted to Assistant Director of Agriculture, and Mr D. C. Todd and Mr. J. R. Low were promoted to the posts of Principal of Bukalasa and Arapai Farm Institutes respectively, following the departure from Uganda of Mr. O. S. Swainson and Mr. J. S. Arthurs, the first Principals of the Institutes.

VIII. ACKNOWLEDGMENTS

277. It gives me great pleasure to acknowledge the contribution which has been made by all members of my staff towards the development and implementation of agricultural policy during the year. I also wish to acknowledge the co-operation of all Departments of Government and Kingdoms, Territorial and District Administrations in Uganda. The unfailing goodwill and co-operation of the Director of the Empire Cotton Growing Corporation Research Station at Namulonge, the Director of the East African Agriculture and Forestry Research Organisation and the Dean of the Faculty of Agriculture at Makerere University College have been of great assistance both in the research and field activities of the Department.

W. V. ROSE,
Director of Agriculture.

ENTEBBE,

APPENDICES

UGANDA RAINFALL, 1962

Station		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL
ABI	Total: ins.	0.18	0.71	3.02	2.43	5.31	3.39	1.98	6.25	5.39	5.04	3.30	1.63	38.63
West Nile	Days	1	2	7	6	13	12	7	12	16	13	9	6	107
3° 05' N.; 30° 55' E.	Mean: ins.	0.67	1.16	3.75	5.06	5.62	5.19	5.47	9.21	7.50	7.85	4.91	1.51	57.90
GULU	Total: ins.	1.13	0.13	5.10	7.09	7.58	11.96	5.13	10.79	10.85	6.47	5.07	3.36	74.66
Acholi	Days	6	2	14	18	19	18	18	19	18	16	12	10	170
2° 45' N.; 32° 20' E.	Mean: ins.	0.49	1.69	3.51	6.82	7.76	5.83	6.55	9.10	7.01	6.51	3.82	1.85	60.94
LIRA (Ngetta)	Total: ins.	1.79	0.18	5.13	3.66	9.54	5.43	5.35	5.92	11.40	3.92	3.49	0.80	56.61
Lango	Days	5	5	12	14	16	13	11	12	20	12	10	2	128
2° 17' N.; 32° 56' E.	Mean: ins.	1.15	1.35	2.50	6.67	7.48	5.09	5.15	8.76	6.61	5.49	3.17	1.66	56.08
MOROTO	Total: ins.	0.13	0.25	3.60	3.63	4.47	3.44	6.92	2.14	1.84	0.35	1.38	0.12	28.27
Karamoja	Days	3	1	9	8	8	5	12	6	4	2	2	4	64
2° 33' N.; 34° 36' E.	Mean: ins.	0.32	1.18	2.93	4.83	5.87	3.53	5.37	4.16	1.99	1.86	1.93	0.98	34.95
SERERE	Total: ins.	1.05	—	8.72	6.37	8.59	4.77	3.38	5.41	6.45	6.88	6.99	0.80	59.41
Teso	Days	6	—	15	19	18	15	13	17	19	16	12	6	149
1° 31' N.; 34° 11' E.	Mean: ins.	0.86	2.09	3.88	8.11	7.57	4.17	4.57	6.56	5.64	4.52	3.82	2.15	53.94
MBALE	Total: ins.	1.18	0.26	3.97	6.99	6.68	5.70	2.15	3.57	6.22	5.07	1.79	1.58	45.16
Mbale	Days	5	3	18	16	18	16	13	18	20	19	7	9	160
1° 06' N.; 34° 10' E.	Mean: ins.	1.03	1.96	3.69	6.38	6.56	4.85	4.52	5.37	4.30	3.34	2.43	1.67	46.10
TORORO	Total: ins.	2.98	0.36	6.06	9.19	15.59	3.96	3.47	7.64	5.28	5.48	5.68	3.33	69.02
Bukedi	Days	9	4	23	25	23	17	13	19	13	19	12	9	179
0° 42' N.; 34° 10' E.	Mean: ins.	2.07	2.64	5.45	8.80	8.70	4.07	3.92	4.71	4.12	4.71	4.04	3.09	56.32
Jinja	Total: ins.	2.31	0.78	5.03	7.85	7.91	2.64	3.23	3.38	5.05	10.98	5.95	2.01	57.12
Busoga	Days	9	3	13	17	17	11	11	13	18	20	11	8	151
0° 28' N.; 33° 11' E.	Mean: ins.	3.13	2.12	4.74	7.53	4.81	1.95	2.54	3.56	3.64	6.65	5.88	3.18	49.73
KABALE	Total: ins.	3.09	2.70	1.33	5.97	2.20	2.62	—	3.36	5.76	6.15	4.07	2.74	39.99
Kigezi	Days	17	17	13	10	12	7	—	11	14	18	16	15	149
1° 15' S.; 29° 59' E.	Mean: ins.	2.40	3.57	4.48	5.35	3.61	1.04	0.78	2.16	3.74	3.87	4.20	3.58	38.78
MBARARA	Total: ins.	5.45	1.66	2.49	5.00	4.11	2.76	0.03	2.75	3.38	5.09	3.79	4.49	41.00
Ankole	Days	14	5	12	13	10	5	1	13	10	17	16	12	128
0° 37' S.; 30° 39' E.	Mean: ins.	1.72	2.45	3.81	4.79	3.18	1.00	0.83	2.42	3.84	4.18	4.48	3.03	35.73
FORT PORTAL	Total: ins.	1.47	1.09	4.21	5.64	5.54	3.32	2.48	5.61	12.39	7.74	7.95	5.43	63.77
Toro	Days	6	4	20	19	19	12	7	7	26	26	19	19	194
0° 40' N.; 30° 17' E.	Mean: ins.	1.36	2.85	5.25	7.30	5.67	3.23	2.35	4.61	7.52	8.45	6.52	3.10	58.21
BULINDI	Total: ins.	1.63	0.22	7.73	5.68	5.94	4.77	1.37	8.83	5.29	11.61	3.76	2.06	58.89
Bunyoro	Days	5	2	11	14	17	8	11	6	13	17	7	8	114
1° 28' N.; 31° 28' E.	Mean: ins.	1.35	2.30	4.22	6.85	5.21	3.55	3.45	6.25	6.51	5.32	4.28	2.21	51.50
MASAKA	Total: ins.	3.41	2.37	5.97	5.63	7.72	2.54	1.25	1.18	9.04	6.16	3.24	4.24	52.75
Masaka	Days	12	12	17	17	16	9	4	5	14	15	11	13	147
0° 20' S.; 31° 44' E.	Mean: ins.	2.05	2.40	4.51	7.02	6.58	1.81	1.41	2.06	3.51	3.99	3.80	3.51	42.65

KAKUMIRO Mubende 0° 46' N.; 31° 19' E.		Total: ins. Days	1·87	0·58	4·73	5·09	2·29	1·43	1·41	5·60	3·69	6·62	6·63	1·62	41·56	Met. No. 89 3101
			5 1·36	1 2·22	15 4·33	11 6·47	10 4·12	6 2·57	5 2·88	12 5·29	17 6·44	15 7·28	15 5·60	8 2·72	120 51·28	
SENDA Mengo 0° 29' N.; 32° 01' E.		Total: ins. Days	2·24	2·03	4·43	5·03	3·34	1·95	1·42	2·42	3·47	9·10	4·37	2·02	41·82	Met. No. 89 3262
			6 1·92	9 2·58	15 4·53	15 6·58	15 4·62	8 2·13	3 1·92	12 4·12	11 4·46	17 5·77	12 4·70	9 3·03	132 46·36	
KAMPALA Mengo 0° 19' N.; 32° 33' E.		Total: ins. Days	2·41	0·92	8·58	7·30	3·31	2·78	0·65	4·84	3·47	7·61	4·60	4·74	51·21	Met. No. 89 3251
			7 2·28	6 2·09	18 4·34	19 6·59	13 5·57	11 2·43	4 2·21	12 4·34	12 3·90	18 4·41	11 4·87	9 3·40	140 46·43	
ENTEBBE Mengo 0° 03' N.; 32° 27' E.		Total: ins. Days	3·26	2·75	8·64	7·98	11·73	1·90	1·66	6·57	2·75	9·50	3·18	2·93	62·85	Met. No. 89 3266
			12 3·92	8 3·40	19 6·56	22 11·04	23 10·13	15 3·86	8 2·55	16 3·60	8 3·44	20 4·25	9 5·74	10 4·95	170 63·44	

COTTON PRODUCTION 1961/62 SEASON

ZONES	ACREAGES*		SALES (Tons of Seed Cotton)		HARVESTED (lb. Seed Cotton)		PRODUCTION (Bales of Lint)	
	Total 1961/62	Mean 1956/57- 1960/61	Total 1961/62	Mean 1956/57- 1960/61	Total 1961/62	Mean 1956/57- 1960/61	Total 1961/62	Mean 1956/57- 1960/61
BUGANDA—								
Mengo ..	316,000	235,000	23,532	42,636	167	404	41,139	72,029
Masaka ..	49,000	31,000	3,374	3,128	154	223	5,639	5,387
Mubende ..	94,000	64,000	4,338	10,410	103	356	7,495	17,633
TOTALS ..	459,000	330,000	31,244	56,175	152	381	54,273	95,050
WESTERN—								
Bunyoro ..	62,000	47,000	3,279	5,439	118	252	5,539	9,144
Toro ..	25,000	32,000	3,613	4,642	324	320	6,252	8,106
TOTALS ..	87,000	79,000	6,892	10,081	179	284	11,791	17,250
EASTERN—								
Busoga ..	462,000	386,000	26,159	58,640	127	340	46,741	100,805
Mbale ..	356,000	323,000	8,869	32,454	56	228	15,096	55,121
South Teso ..	92,000	62,000	1,879	5,531	46	200	3,155	9,648
South Teso Segregated ..	48,000	37,000	1,975	4,465	45	269	1,627	7,458
North Teso ..	77,000	59,000	1,136	4,928	33	187	1,908	8,376
Usuku ..	17,000	18,000	791	1,697	104	221	1,329	2,867
TOTALS ..	1,052,000†	885,000	39,809†	107,715	85	274	69,856	184,274
NORTHERN—								
Lango ..	224,000	185,000	10,929	19,863	109	240	18,144	33,851
East Acholi ..	96,000	61,000	5,086	7,154	119	234	8,342	12,294
West Acholi ..	56,000	53,000	4,808	7,211	192	297	7,779	12,083
West Nile ..	99,000	62,000	5,962	9,475	135	339	10,952	16,363
TOTALS ..	476,000†	361,000	26,785†	43,704	126	271	45,217	74,591
UGANDA TOTALS ..	2,072,000	1,656,000	104,730	217,675	113	295	181,137§	371,165

* Corrected to 1,000 acres.

† These figures do not agree with regional totals as shown in Appendices III (a), III (c) and III (e) due to the fact that the boundaries of the zones listed under Eastern and Northern Regions do not coincide with regional boundaries. The differences are compensating and the Uganda totals in Tables II (a) and III (a) agree.

‡ Similarly these figures do not agree with those in Appendix IV (a) the Uganda totals, however agree.

COTTON PRODUCTION 1962/63 SEASON

Monthly Plantings—Acres

REGION AND ZONE	April	May	June	July	Aug.	Sept.	Oct.	TOTAL
BUGANDA—								
Mengo ..	—	4,511	53,288	63,318	58,593	1,906	—	181,616
Masaka ..	—	330	1,966	6,770	9,245	5,912	—	24,223
Mubende ..	—	1,165	13,983	32,852	24,034	63	—	72,097
TOTAL ..	—	6,006	69,237	102,940	91,872	7,881	—	277,936
WESTERN—								
Bunyoro ..	—	2,910	5,140	23,024	17,349	2,481	—	50,904
Toro ..	—	—	—	249	14,502	5,352	74	20,177
TOTAL ..	—	2,910	5,140	23,273	31,851	7,833	74	71,081
EASTERN—								
Busoga ..	1,562	63,414	151,158	135,228	105,709	10,221	—	467,292
Mbale ..	3,892	32,522	107,090	118,431	75,832	10,312	—	348,079
Teso* ..	5,170	48,819	59,734	40,107	15,950	—	—	169,780
South Teso Segregated	1,019	7,064	10,449	5,265	5,562	—	—	29,359
Usuku ..	788	8,193	13,174	1,335	44	—	—	23,534
TOTAL ..	12,431	160,012	341,605	300,366	203,097	20,533	—	1,038,044†
NORTHERN—								
Lango ..	1,141	10,035	64,631	69,505	38,893	6,405	—	190,610
East Acholi ..	34	5,313	26,346	37,440	18,778	4,126	—	92,037
West Acholi ..	39	3,623	15,231	30,591	18,258	1,954	—	69,696
West Nile ..	—	62	14,607	32,956	13,642	2,788	—	64,055
TOTAL ..	1,214	19,033	120,815	170,492	89,571	15,273	—	416,398†
UGANDA TOTALS ..	13,645	187,961	536,797	597,071	416,391	51,520	74	1,803,459

* North and South Teso zones were combined with effect from November, 1962.

† These figures do not agree with those in Tables III (c) and III (e) due to the fact that the boundaries of the zones listed under Eastern and Northern Regions do not coincide with regional boundaries. The differences are compensating: the national total agrees with that shown in Table III (a).

COTTON PRODUCTION 1962/63 SEASON

Appendix II (c)

Cotton: Monthly Plantings as Percentages of Total

REGION AND ZONE		APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
		1962/63	Mean 1957/58- 1961/62	1962/63	Mean 1957/58- 1961/62	1962/63	Mean 1957/58- 1961/62	1962/63	Mean 1957/58- 1961/62	1962/63	Mean 1957/58- 1961/62	1962/63	Mean 1957/58- 1961/62
BUGANDA—													
..	..	—	—	2.5	3.2	29.3	32.1	34.9	41.3	32.3	20.7	1.0	2.7
..	..	—	—	1.4	10.9	8.1	25.5	27.9	25.6	38.2	25.8	24.4	12.2
..	..	—	—	1.6	2.8	19.4	21.6	45.6	40.9	33.3	32.0	0.1	2.7
TOTAL ..		—	—	2.2	3.9	24.9	29.3	37.0	39.7	33.1	23.5	2.8	3.6
WESTERN—													
..	..	—	—	5.7	4.0	10.1	18.3	45.2	48.0	34.1	29.4	4.9	0.3
..	..	—	—	—	—	—	0.2	1.2	9.2	71.9	63.5	27.0*	27.1
TOTAL ..		—	—	4.1	2.5	7.2	11.6	32.8	33.5	44.8	42.1	11.1*	10.3
EASTERN—													
..	..	0.3	0.7	13.6	22.3	32.4	32.0	28.9	31.3	22.6	13.1	2.2	0.6
..	..	1.1	2.3	9.3	17.7	30.8	32.5	34.0	31.9	21.8	14.9	3.0	0.7
..	..	3.0	7.1	28.8	38.0	35.2	29.2	23.6	21.0	9.4	4.7	—	—
..	..	3.5	4.7	24.1	33.5	35.6	32.6	17.9	22.8	18.9	6.4	—	—
..	..	3.4	9.4	34.7	56.0	56.0	26.8	5.7	7.6	0.2	0.2	—	—
TOTAL ..		1.2	2.5	15.4	24.0	32.9	31.7	28.9	29.3	19.6	12.0	2.0	0.5
NORTHERN—													
..	..	0.6	0.9	5.3	12.9	33.9	41.1	36.5	33.8	20.4	11.1	3.3	0.2
..	..	—	0.9	5.8	16.4	28.6	36.8	40.7	32.3	20.4	13.3	4.5	0.3
..	..	—	0.1	5.2	7.1	21.9	40.4	43.9	39.8	26.2	12.1	2.8	0.5
..	..	—	—	0.1	2.0	22.8	24.5	51.4	45.9	21.3	24.7	4.4	2.9
TOTAL ..		0.3	0.6	4.6	10.8	29.0	37.4	40.9	36.6	21.5	13.9	3.7	0.7
UGANDA TOTALS ..		0.8	1.4	10.4	16.0	29.8	31.5	33.1	33.2	23.1	16.2	2.8	1.7

* Includes October planting.

COTTON PRODUCTION

Number of bales of 400 lb., 1907-1962

(Note:—All figures are corrected to 1,000 bales)

Season	Bales (Actual)	Bales (5-year average)	Season	Bales (Actual)	Bales (5-year average)
1907	2,000	—	1935/36 ..	316,000	321,000
1908	4,000	—	1936/37 ..	332,000	325,000
1909	5,000	9,000	1937/38 ..	418,000	335,000
1910	12,000	13,000	1938/39 ..	307,000	344,000
1911	20,000	21,000	1939/40 ..	300,000	326,000
1912/13 ..	26,000	25,000	1940/41 ..	365,000	264,000
1913/14 ..	40,000	27,000	1941/42 ..	238,000	241,000
1914/15 ..	26,000	28,000	1942/43 ..	112,000	236,000
1915/16 ..	22,000	29,000	1943/44 ..	191,000	208,000
1916/17 ..	28,000	26,000	1944/45 ..	272,000	207,000
1917/18 ..	27,000	30,000	1945/46 ..	227,000	218,000
1918/19 ..	36,000	44,000	1946/47 ..	231,000	258,000
1919/20 ..	47,000	48,000	1947/48 ..	170,000	272,000
1920/21 ..	81,000	60,000	1948/49 ..	391,000	295,000
1921/22 ..	48,000	78,000	1949/50 ..	339,000	325,000
1922/23 ..	88,000	108,000	1950/51 ..	346,000	355,000
1923/24 ..	128,000	128,000	1951/52 ..	380,000	357,000
1924/25 ..	196,000	145,000	1952/53 ..	320,000	349,000
1925/26 ..	180,000	155,000	1953/54 ..	398,000	352,000
1926/27 ..	134,000	170,000	1954/55 ..	300,000	351,000
1927/28 ..	138,000	156,000	1955/56 ..	364,000	357,000
1928/29 ..	204,000	157,000	1956/57 ..	372,000	358,000
1929/30 ..	125,000	173,000	1957/58 ..	351,000	370,000
1930/31 ..	189,000	204,000	1958/59 ..	401,000	371,000
1931/32 ..	207,000	220,000	1959/60 ..	360,000	333,000
1932/33 ..	295,000	246,000	1960/61 ..	371,000	
1933/34 ..	286,000	271,000	1961/62 ..	181,000	
1934/35 ..	253,000	296,000			

CROP PRODUCTION

Estimated Acreages under Crops, 1961 and 1962—African Cultivation
(Thousand Acres)

CROP	Buganda		Eastern		Northern		Western		Total	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Beans (Mixed)	135.4	153.4	226.3	190.9	243.8	218.1	116.4	114.9	721.9	677.3
Beans (Soya)	5.3	2.0	—	—	—	—	1.3	0.4	6.6	2.4
Cassava	79.3	69.3	297.3	249.8	295.4	247.9	112.8	85.9	784.8	652.9
Cocoa	0.1	0.2	*	*	—	—	*	*	0.1	0.2
Coffee (Arabica)	1.6	1.6	24.4	24.5	0.3	1.5	14.3	16.5	40.6	44.1
Coffee (Robusta)	515.3	538.0	7.3	7.3	0.1	0.4	15.2	15.3	537.9	561.0
Cotton	458.9	277.9	1,084.3	1,061.6	442.8	392.9	86.3	71.1	2,072.1	1,803.5
Grams	2.4	4.3	4.0	4.3	—	0.5	—	—	6.4	9.1
Groundnuts	88.2	143.2	320.0	314.3	112.6	122.9	35.2	35.3	556.0	615.7
Maize	155.3	169.7	153.3	142.3	66.9	51.8	65.5	58.5	441.0	422.3
Millet (Sorghum)	60.9	60.2	159.1	291.3	314.8	220.8	185.4	152.7	720.2	725.0
Millet (Finger)	24.1	28.5	769.1	778.0	362.0	383.6	126.8	116.5	1,282.0	1,306.6
Millet (Bulrush)	—	—	0.2	2.5	—	—	—	—	0.2	2.5
Onions	—	—	—	—	—	—	3.2	2.3	3.2	2.3
Peas (Pigeon)	—	—	0.1	0.4	138.4	145.6	1.5	0.2	140.0	146.2
Peas (Field)	—	—	—	—	—	—	41.9	24.7	41.9	24.7
Plantains	502.1	510.1	433.6	482.9	6.6	7.5	578.8	602.8	1,521.1	1,603.3
Potatoes (Sweet)	124.0	90.9	255.8	218.1	123.6	173.3	201.5	144.6	704.9	626.9
Potatoes (Solatum)	—	—	0.3	0.3	—	—	12.1	5.1	12.4	5.4
Rice	—	—	1.7	0.7	2.3	3.9	2.5	3.3	6.5	7.9
Sim-sim	—	—	19.6	13.4	239.2	185.9	3.8	3.4	269.4	206.1
Tobacco (Fire-cured)	6.8	3.4	—	—	1.0	1.5	4.4	6.9	5.7	7.8
Tobacco (Flue-cured)	0.3	0.3	—	—	2.7	—	0.6	0.6	3.3	2.1
Tea	—	—	—	—	—	—	0.4	0.8	0.4	0.8
TOTAL	2,160.0	2,053.0	3,756.4	3,782.6	2,352.5	2,159.6	1,609.9	1,460.9	9,878.6	9,456.1

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION

Estimated Acreages under Crops, 1961 and 1962—African Cultivation

BUGANDA REGION

(Thousand Acres)

CROP	MENGO		MASAKA		MUBENDE		TOTAL	
	1961	1962	1961	1962	1961	1962	1961	1962
Beans (Mixed)	87.4	86.8	33.6	46.9	14.4	19.7	135.4	153.4
Beans (Soya)	0.6	2.0	4.7	—	—	—	5.3	2.0
Cassava	60.0	55.8	11.8	7.1	7.5	6.4	79.3	69.3
Cocoa	0.1	0.2	*	*	*	*	0.1	0.2
Coffee (Arabica)	0.6	0.6	1.0	1.0	—	—	1.6	1.6
Coffee (Robusta)	365.3	365.3	134.2	154.8	15.8	17.9	515.3	538.0
Cotton	388.2	233.5	49.0	24.2	21.7	20.2	458.9	277.9
Grams	0.1	0.6	1.1	—	1.2	3.7	2.4	4.3
Groundnuts	57.4	75.9	17.7	52.4	13.1	14.9	88.2	143.2
Maize	110.6	120.5	37.5	39.2	7.2	10.0	155.3	169.7
Millet (Sorghum)	34.2	31.9	21.4	20.9	5.3	7.4	60.9	60.2
Millet (Finger)	18.2	19.9	1.9	0.8	4.0	7.8	24.1	28.5
Plantains	334.8	334.8	141.5	154.4	25.8	20.9	502.1	510.1
Potatoes (Sweet)	90.9	62.9	18.0	14.2	15.1	13.8	124.0	90.9
Sim-sim	6.1	3.0	—	—	0.7	0.4	6.8	3.4
Tobacco (Fire-cured)	—	—	—	—	0.3	0.3	0.3	0.3
TOTAL	1,554.5	1,393.7	473.4	515.9	132.1	143.4	2,160.0	2,053.0

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION
Estimated Acreages under Crops, 1961 and 1962—African Cultivation
EASTERN REGION
(Thousand Acres)

Crop	BUSOGA		BUKEDI		BUGISU		TESO		KARAMOJA		TOTAL	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Beans (Mixed and Cow-peas)	..	..	..	..	..	..	..	..	..	..	..	..
Cassava ..	37.4	22.1	43.4	41.1	33.3	30.3	112.2	97.0	0.4	0.4	226.3	190.9
Cocoa ..	56.6	41.4	100.9	89.0	23.0	17.8	116.8	101.4	0.2	0.2	297.3	249.8
Coffee (Arabica) ..	*	*	..	..	..	..	..	..	..	..	*	*
Coffee (Robusta) ..	..	..	..	..	24.4	24.5	*	*	..	..	24.4	24.5
Cotton ..	7.3	7.3	..	..	..	..	..	..	..	..	..	..
Grams ..	462.4	467.3	229.8	213.8	58.8	60.3	333.3	318.1	2.2	2.1	1,084.3	1,061.6
Groundnuts ..	..	..	..	..	..	..	4.0	4.3	..	..	4.0	4.3
Maize ..	125.4	106.5	58.1	69.0	13.2	10.2	123.3	127.7	0.8	0.9	320.0	314.3
Millet (Sorghum) ..	60.5	51.6	24.0	26.8	60.7	49.5	8.1	9.1	5.2	5.3	153.3	142.3
Millet (Finger) ..	3.1	2.6	23.2	19.4	8.6	10.4	124.2	153.9	80.2	105.0	159.1	291.3
Millet (Bulrush) ..	156.4	115.1	148.0	197.2	84.8	97.8	379.9	365.9	2.3	2.0	769.1	778.0
Millet (Bulrush) ..	..	..	..	..	..	..	0.2	..	..	..	2.5	2.5
Peas (Pigeon) ..	..	..	..	..	..	..	0.1	..	..	..	0.1	0.4
Plantains ..	197.4	198.7	32.0	32.3	200.0	250.1	4.2	1.8	..	*	433.6	482.9
Potatoes (Sweet) ..	81.2	80.0	43.6	31.0	17.1	24.9	113.9	81.9	..	0.3	255.8	218.1
Potatoes (Solanum) ..	..	..	..	..	0.3	0.3	..	..	..	..	0.3	0.3
Rice ..	0.3	0.2	1.2	0.3	*	..	0.2	0.2	..	..	1.7	0.7
Sim-sim ..	3.5	2.9	1.1	0.7	*	*	15.0	8.5	1.3	1.3	19.6	13.4
TOTAL ..	1,191.5	1,095.7	705.3	720.6	524.2	576.1	1,335.4	1,269.8	92.6	120.4	3,756.4	3,782.6

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION

Estimated Acreages under Crops, 1961 and 1962—African Cultivation

WESTERN REGION

(Thousand Acres)

CROP	ANKOLE		BUNYORO		KICEZI		TORO		TOTAL	
	1961	1962	1961	1962	1961	1962	1961	1962	1961	1962
Beans (Mixed and Cow-Peas)	..	21.7	10.2	17.7	54.1	46.7	31.4	28.8	116.4	114.9
Beans (Soya) ..	0.1	0.2	—	—	—	—	1.2	0.2	1.3	0.4
Cassava ..	13.1	12.3	50.6	29.8	3.3	3.6	45.8	40.2	112.8	85.9
Coffee (Arabica)	6.0	6.5	—	0.3	3.8	5.2	4.5	4.5	14.3	16.5
Coffee (Robusta)	7.4	7.5	1.6	1.6	1.4	1.4	4.8	4.8	15.2	15.3
Cotton ..	—	—	61.7	50.9	—	—	24.6	20.2	86.3	71.1
Grams ..	—	12.8	9.7	9.5	7.0	5.4	—	—	—	—
Groundnuts ..	10.6	6.2	9.6	15.9	27.0	23.3	7.9	7.6	35.2	35.3
Maize ..	5.4	10.4	3.3	4.2	167.3	136.9	23.5	13.1	65.5	58.5
Millet (Sorghum)	10.8	4.0	14.8	11.5	50.3	40.1	4.0	1.2	185.4	152.7
Millet (Finger)	43.2	0.8	0.3	0.3	0.8	0.4	18.5	20.9	126.8	116.5
Onion ..	0.7	4.0	—	1.0	36.8	16.1	1.4	0.8	3.2	2.3
Peas (Field)	4.6	—	—	—	—	—	0.5	3.6	41.9	24.0
Peas (Pigeon) ..	—	—	1.2	—	—	—	0.3	0.2	1.5	0.2
Plantains ..	386.0	389.3	20.0	20.0	81.8	98.6	91.0	94.9	578.8	602.8
Potatoes (Sweet)	21.7	19.1	14.4	20.2	140.6	81.5	24.8	23.8	201.5	144.6
Potatoes (Solanum)	0.2	0.3	*	*	11.5	4.3	0.4	0.5	12.1	5.1
Rice ..	—	—	—	—	—	—	2.5	3.3	2.5	3.3
Sim-sim ..	*	*	3.8	3.0	—	—	*	0.4	3.8	3.4
Tobacco (Fire-cured)	—	—	3.2	4.9	1.0	0.8	0.2	0.3	4.4	6.0
Tobacco (Flue-cured)	—	—	—	—	0.6	0.6	—	—	0.6	0.6
Tea ..	*	0.1	—	—	*	0.2	0.3	0.6	0.4	0.8
TOTAL ..	530.5	535.2	204.4	190.8	587.3	465.1	287.6	269.9	1,609.9	1,460.9

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION
Estimated Acreages under Crops, 1961 and 1962—African Cultivation
NORTHERN REGION
(Thousand Acres)

CROP	LANGO		ACHOLI		WEST NILE/MADI		TOTAL	
	1961	1962	1961	1962	1961	1962	1961	1962
Beans (Mixed and Cow-peas)	125.4	99.9	32.3	35.1	85.7	83.1	243.8	218.1
Cassava	75.0	68.7	48.1	63.0	172.1	116.2	295.4	247.9
Coffee (Arabica)	—	—	*	—	0.3	1.5	0.3	1.5
Coffee (Robusta)	—	—	—	—	0.1	0.4	0.1	0.4
Cotton	196.4	173.0	145.1	155.8	99.1	64.1	442.8	392.9
Grams	—	0.4	—	—	*	0.1	—	0.5
Groundnuts	34.9	39.5	49.9	49.6	27.0	33.8	112.6	122.9
Maize	12.5	14.8	6.7	8.9	42.5	28.1	66.9	51.8
Millet (Sorghum)	152.0	133.7	63.8	63.0	18.8	24.1	314.8	220.8
Millet (Finger)	166.1	120.4	126.6	135.6	67.0	127.6	362.0	383.6
Millet (Bulrush)	—	—	—	—	—	—	—	—
Peas (Pigeon)	87.3	103.2	45.3	33.8	5.8	8.6	138.4	145.6
Plantains	1.5	5.3	1.0	1.2	4.1	1.0	6.6	7.5
Potatoes (Sweet)	57.3	60.1	31.6	45.3	34.7	67.9	123.6	173.3
Rice	1.5	2.2	—	0.2	0.8	1.5	2.3	3.9
Sim-sim	113.2	85.4	83.4	88.7	41.3	11.8	239.2	185.9
Tobacco (Fire-cured)	—	—	—	—	1.0	1.5	1.0	1.5
Tobacco (Flue-cured)	*	*	0.9	0.5	1.8	1.0	2.7	1.5
TOTAL	1,023.1	906.6	634.7	680.7	602.1	572.3	2,352.5	2,159.6

* Under fifty acres.

(All figures corrected to nearest 100 acres)

CROP PRODUCTION
Quantities Marketed and Estimated
(Values Based on Prices)

Region/District	Coffee		Seed Cotton		Tobacco Flue-cured (cured leaf)	
	Value	Quantity	Value	Quantity	Value	Quantity
	£	Tons	£	Tons	£	Tons
<i>Eastern—</i>						
Busoga	197,625	26,159	1,470,902	—	—	—
Bugisu	1,962,439	1,668	90,086	—	—	—
Bukedi	—	6,518	352,073	—	—	—
Teso	—	6,102	354,494	—	—	—
Karamoja	—	107	6,716	—	—	—
TOTAL ..	2,160,064	40,554	2,274,271	—	—	—
<i>Northern—</i>						
Lango	—	10,577	640,625	1	—	—
Acholi	—	9,501	566,845	111	33,000	33,000
West Nile/Madi	42,660	5,962	340,842	146	43,000	43,000
TOTAL ..	42,660	26,040	1,548,312	258	77,000	77,000
<i>Western—</i>						
Bunyoro	20,781	3,279	188,740	—	—	—
Toro	403,987	3,613	214,886	—	—	—
Kigezi	126,207	—	—	—	—	—
Ankole	602,800	—	—	—	—	—
TOTAL ..	1,153,775	6,892	403,626	—	—	—
<i>Buganda—</i>						
Mengo	10,376,651	26,809	1,628,998	—	—	—
Masaka		3,374	188,997	—	—	—
Mubende		1,061	62,125	—	—	—
TOTAL ..	10,376,651	31,244	1,880,120	—	—	—
UGANDA TOTALS ..	13,733,150	104,730	6,106,329	258	77,000	77,000

* A distinction was made formerly between air-cured and fire-cured leaf. This distinction is now obsolete.

NOTE.—Crops included in this table are those for which quantities marketed and estimated values are available. Crops for which quantities marketed are not included as reliable estimates of quantities and value are not available. All values are in Uganda Shillings.

Values (African Production)
paid to Growers)

ed	Tobacco Flue-cured (green leaf)		Tobacco Fire-cured* (cured leaf)		TOTAL VALUE	
	Quantity	Value	Quantity	Value	1962	1961
	Tons	£	Tons	£	£	£
—	—	—	—	—	1,668,527	3,570,386
—	—	—	—	—	2,052,525	1,272,967
—	—	—	—	—	352,073	1,354,187
—	—	—	—	—	354,494	1,164,331
—	—	—	—	—	6,716	25,655
—	—	—	—	—	4,434,335	7,387,526
141	—	—	—	—	642,276	1,465,912
101	180	2,296	—	—	602,342	1,061,468
102	2,448	27,564	436	53,885	508,553	847,553
44	2,628	29,860	436	53,885	1,753,171	3,374,933
—	—	—	970	121,982	331,503	433,867
—	—	—	—	—	618,873	514,689
—	683	5,396	—	—	131,603	70,116
—	—	—	—	—	602,800	308,489
—	683	5,396	970	121,982	1,684,779	1,327,161
—	—	—	—	—	12,260,974	6,351,329
—	—	—	—	—		3,692,314
—	—	—	37	4,203		374,476
—	—	—	37	4,203	12,260,974	10,418,119
44	3,311	35,256	1,443	180,070	20,133,259	22,507,739

n is no longer realistic and the two categories have now been combined.
known with accuracy. Crops such as maize, groundnuts, etc., of which considerable quantities
figures in this table given to nearest ton and £.

COFFEE PRODUCTION
Quantities Marketed
(Values Based on 1964 Prices)

REGION/DISTRICT	ARABICA					
	Parchment		Rough-hulled		Dried Coffee	
	Quantity	Value	Quantity	Value	Quantity	Value
	<i>Tons</i>	<i>£</i>	<i>Tons</i>	<i>£</i>	<i>Tons</i>	<i>£</i>
<i>Eastern—</i>						
Busoga	—	—	—	—	—	—
Bugisu	9,704	1,935,827	—	—	475	—
Bukedi	—	—	—	—	—	—
Karamoja	—	—	—	—	—	—
Teso	—	—	—	—	—	—
TOTAL ..	9,704	1,935,827	—	—	475	—
<i>Northern—</i>						
Lango	—	—	—	—	—	—
Achoi	—	—	—	—	—	—
West Nile	101	19,230	107	19,414	3	—
TOTAL ..	101	19,230	107	19,414	3	—
<i>Western—</i>						
Bunyoro	5	952	—	—	—	—
Toro	—	—	911	165,284	103	—
Kigezi	31	5,902	350	63,504	49	—
Ankole	—	—	243	44,090	2,273	—
TOTAL ..	36	6,854	1,504	272,878	2,425	—
<i>Buganda†</i>	—	—	771	139,882	790	—
UGANDA TOTALS ..	9,841	1,961,911	2,382	432,174	3,693	—

* Includes a small quantity from Bukedi.

† It has not been possible to allocate production to Mengo, Masaka and Mubende as processing factory.

‡ Includes 119 tons of Arabica valued at £21,847.

PRODUCTION, 1962

and Estimated Values

(Prices paid to Growers)

	ROBUSTA						TOTAL VALUE
herry	Rough-hulled		Dried Cherry		Clean		
Value	Quantity	Value	Quantity	Value	Quantity	Value	
£	Tons	£	Tons	£	Tons	£	£
—	—	—	3,286*	197,625	—	—	197,625
26,612	—	—	—	—	—	—	1,962,439
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
26,612	—	—	3,286	197,625	—	—	2,160,064
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
242	21	2,431	15	902	4	441	42,660
242	21	2,431	15	902	4	441	42,660
—	4	464	322	19,365	—	—	20,781
8,306	1,664	194,409	554	35,988	—	—	403,987
3,951	3	348	873	52,502	—	—	126,207
183,282	9	1,014	6,908	374,414	—	—	602,800
195,539	1,680	196,235	8,657	482,269	—	—	1,153,775
63,702	6,215	719,085	82,842	4,982,158	40,437‡	4,471,824‡	10,376,651
286,095	7,916	917,751	94,800	5,662,954	40,441	4,472,265	13,733,150

separately, as formerly, due to transfers across the boundaries of these divisions from growing area to

ARTICLE	UNIT	QUANTITIES			VALUE IN £		
		1960	1961	1962	1960	1961	1962
<i>Oilseeds and Products:</i>							
Cotton Seed ..	Tons ..	39	—	—	720	—	—
Castor Seed ..	Tons ..	1,684	1,720	2,581	90,558	93,819	112,941
Groundnuts ..	Tons ..	9,507	9,179	7,247	549,962	542,201	345,066
Sesame Seed ..	Tons ..	356	875	1,110	20,904	53,548	79,994
Sunflower Seed ..	Tons ..	292	67	20	8,271	2,065	933
Cotton Seed Cake ..	Tons ..	71,643	62,166	28,622	1,661,492	1,314,639	681,158
Cotton Seed Oil ..	Tons ..	93	197	54	11,559	27,833	7,211
Groundnut Oil ..	Tons ..	—	52	39	—	6,704	5,520
Other Vegetable Oils ..	Tons ..	4	53	3	550	7,437	410
Other Oilseed Cake, Meals and Other Vegetable Oil Residue ..	Tons ..	—	3,896	6,487	—	98,167	175,448
<i>Fibres:</i>							
Cotton, Raw ..	Tons ..	58,933	62,197	32,233	14,930,252	16,716,472	8,259,722
Sisal ..	Tons ..	621	566	454	51,585	43,309	36,402
<i>Beverage Crops and Tobacco:</i>							
Coffee, not roasted ..	Tons ..	116,818	103,187	130,944	16,987,063	13,978,591	20,173,957
Tea ..	Tons ..	3,861	3,794	5,182	1,452,600	1,472,083	1,996,980
Unmanufactured Tobacco ..	Tons ..	86	20	*	17,710	4,574	23
<i>Spices and Drugs:</i>							
Chillies ..	Tons ..	201	338	526	53,845	81,417	91,643
Papain ..	Tons ..	5	3	7	6,179	3,523	16,042
Vanilla ..	Tons ..	2	3	1	12,960	12,515	4,925
<i>Beans and Pulses:</i>							
Soya Beans ..	Tons ..	443	376	13	13,785	12,391	381
Others ..	Tons ..	3,336	2,744	550	99,308	76,302	18,788
<i>Cereals:</i>							
Maize (Unmilled) ..	Tons ..	1,554	—	4,323	26,872	—	66,652
Maize meal ..	Tons ..	3,486	753	5,637	46,581	10,947	100,376
Others (Unmilled) ..	Tons ..	8	1	405	230	28	12,330
<i>Miscellaneous:</i>							
Rubber ..	Tons ..	—	—	3	—	—	315
Ethyl Alcohol ..	Imp. gal. ..	7,360	4,119	3,825	2,263	1,359	1,316
Sugar ..	Tons ..	—	329	11	—	17,219	679
TOTAL					36,045,186	34,577,153	32,189,212

Source: East African Customs and Excise Annual Trade Reports, 1960, 1961 and 1962.

* Under 0.5 Tons.

EXPORTS OF AGRICULTURAL PRODUCE TO KENYA AND TANGANYIKA: 1962

Appendix V (b)

ARTICLE	UNIT	QUANTITIES			VALUE IN £		
		To Kenya	To Tanganyika	Total	To Kenya	To Tanganyika	Total
<i>Oilseeds and Products:</i>							
Cotton Seed Cake	Tons	1,131	—	1,131	13,675	—	13,675
Other Oilseed Cakes, Meals and Other Vegetable Oil Residue	Tons	564	—	564	11,901	—	11,901
Sesame Seed	Tons	1	—	1	41	—	41
Groundnuts	Tons	227	28	255	9,765	1,310	11,075
Cotton Seed Oil	Tons	3,916	691	4,607	524,314	87,662	611,976
Groundnut Oil	Tons	3,633	110	3,743	41,945	11,734	53,679
Other Vegetable Oil	Tons	180	111	291	21,870	13,612	35,482
<i>Beverage Crops and Tobacco:</i>							
Coffee, not roasted	Tons	334	—	334	28,770	—	28,770
Tea	Tons	255	7	262	88,878	2,680	91,558
Unmanufactured Tobacco	Lb.	2,275,637	307,360	2,582,997	333,618	28,883	362,501
Cigar, Cheroots and Manufactured Tobacco	Lb.	1,015	195	1,210	474	99	573
<i>Spices:</i>							
Chillies	Tons	34	3	37	2,703	320	3,023
Others	Tons	128	61	189	20,570	6,802	27,372
<i>Fibres:</i>							
Cotton Linters	Tons	10	3	13	1,096	386	1,482
Sisal	Tons	—	—	—	—	—	—
<i>Cereals:</i>							
Maize (Unmilled)	Tons	200	180	380	3,574	3,096	6,670
Millet	Tons	1,474	4,109	5,583	35,381	99,214	134,595
Other	Tons	1	—	1	74	—	74
<i>Pulses:</i>							
Beans, Peas and Lentils	Tons	1,409	856	2,265	44,931	26,813	71,744
<i>Miscellaneous:</i>							
Rubber	Tons	19	—	19	3,705	—	3,705
Ethyl Alcohol	Imp. gal.	21,314	17,962	39,276	5,983	4,498	10,481
Sugar	Tons	35,840	—	35,840	1,627,076	—	1,627,076
Jaggery	Tons	4	1	5	203	43	246
Molasses	Tons	602	—	602	3,349	—	3,349
				Total	2,823,896	287,152	3,111,048

CROP PRODUCTION, UGANDA

Estate Production, 1961 and 1962

CROP	ESTIMATED ACREAGES		ESTIMATED PRODUCTION			
			Quantity		Value	
	1961	1962	1961	1962	1961	1962
			<i>Tons</i>	<i>Tons</i>	<i>£</i>	<i>£</i>
Coffee (Robusta)	20,022*	19,214*	3,433	6,130	415,393	839,810
Coffee (Arabica) ..	2,395*	2,344*	199	248	47,760	58,280
Sugar	42,865	41,238†	95,500	104,310	3,851,721	4,628,586
Tea	18,926	21,000†	5,035	6,195	1,953,377	2,385,075
Sisal	6,000	6,000	518	415	28,000	18,000
TOTAL ..	94,428	89,796	—	—	6,313,070	7,929,751

* Bearing acreages.

† Includes 1,765 acres held by outgrowers. A total of 5,800 acres of estate sugar was under irrigation.

‡ Based on recent trend. Final acreage returns not available at time of going to press.

POPULATION AND AVAILABILITY OF LAND

Appendix VII

Region/District	Total area Sq. miles	Area of land excluding open water and swamps reserved forests Sq. miles	Cultivated area 1962 Thousand acres	Population* 1962	Population density Per sq. mile	Cultivated land per head of population Acres	Estimated available land per head of population Acres	Ratio of available land to cultivated land
<i>Buganda—</i>								
Mengo ..	14,417	9,221	1,228	1,404,000	152	0.9	4.2	4.8
Masaka ..	7,978	3,649	434	472,000	129	0.9	4.9	5.4
Mubende ..	2,701	2,570	108	104,000	40	1.0	15.8	15.2
TOTAL ..	25,096	15,440	1,770	1,980,000	128	0.9	5.0	5.6
<i>Eastern—</i>								
Busoga ..	6,940	3,133	832	701,000	224	1.2	2.9	2.4
Bugisu, Sebei and Mbale Township ..	1,686	1,217	552	381,000	313	1.4	2.0	1.4
Bukedi ..	1,786	1,533	508	417,000	153	1.2	2.3	1.9
Teso ..	4,954	4,249	780	465,000	109	1.7	5.8	3.5
Karamoja ..	9,230	8,094	120	184,000	23	0.6	28.1	43.2
TOTAL ..	24,596	18,226	2,792	2,148,000	118	1.3	5.4	4.2
<i>Northern—</i>								
Acholi ..	10,854	10,347	461	303,000	29	1.5	21.8	14.4
Lango ..	5,054	4,333	724	375,000	86	1.9	7.4	3.8
West Nile/Madi ..	6,051	5,252	672	459,000	87	1.5	7.3	5.0
TOTAL ..	21,959	19,932	1,857	1,137,000	57	1.6	11.2	6.9
<i>Western—</i>								
Bunyoro ..	5,935	4,025	191	130,000	32	1.5	19.8	13.5
Toro ..	5,233	3,920	230	371,000	95	0.6	6.8	10.9
Ankole ..	6,276	5,378	522	563,000	105	0.9	6.1	6.6
Kigezi ..	2,039	1,689	409	517,000	306	0.8	2.1	2.6
TOTAL ..	19,483	15,012	1,352	1,581,000	105	0.9	6.1	7.1
UGANDA TOTALS	91,134	68,610	7,771	6,846,000	100	1.1	6.4	5.6

* Estimates for January 1962, based on 1959 Census of Population and inter-censal rates of growth. This calculation does not take into account internal migration between districts. Figures are given to the nearest thousand

PRINCIPAL AGRICULTURAL LEGISLATION

Subject	Ordinance or Act No.	Legal Notice No.	Short Title	Objects
Coffee	Ord. 14	—	The Bugisu Coffee Ordinance, 1962..	An Ordinance to make provision for the promotion, processing, marketing and the fixing of prices of coffee in Bugisu; for winding-up the Bugisu Coffee Board and for transferring certain of its functions to trustees, the Bugisu Co-operative Union Ltd. and to the Government, and for matters incidental to and connected with all such purposes.
Coffee	Act 14	—	The Bugisu Coffee (Amendment) Act, 1962	An Act to amend the Bugisu Coffee Ordinance, 1962..
Coffee	Ord. 33	—	The Coffee (Amendment) Ordinance, 1962..	An Ordinance to amend the Coffee Ordinance, 1959.
Coffee	Ord. 19	—	The Coffee (Export Duty) (Amendment) Ordinance, 1962..	An Ordinance to amend the Coffee (Export Duty) Ordinance, 1960.
Coffee	—	328	The Coffee (Certificates of Origin) Rules, 1962	Rules to enable the issue of certificates for all coffee exported outside East Africa in pursuance of the International Coffee Agreement.
Coffee	Ord. 59	246	The Coffee Research Fund (Disposal) Ordinance, 1962	An Ordinance to make provision for the transfer to the Coffee Marketing Board of money held by the Secretary to the Treasury and by the Director of Agriculture under section 5 of the Coffee Industry Ordinance.
Coffee	Act 13	—	The Coffee (Special Provisions) Act, 1962.. ..	An Act to validate certain rules relating to the export of coffee and to make provision consequent thereon.
Cotton	Ord. 36	212	The Lint Marketing Board (Amendment) Ordinance, 1962	An Ordinance to amend the Lint Marketing Board Ordinance, 1959.
Produce Marketing ..	—	216	The Controlled Produce Marketing (Amendment) Rules, 1962	Rules amending the Produce Marketing Ordinance, 1953.
Produce Marketing ..	—	213	Declaration of Controlled Produce and a Buying Season	Declaration of controlled produce and a buying season.
Produce Marketing ..	—	321	The Minimum Prices (Controlled Produce) Order, 1962	Declaring minimum prices to growers of declared primary produce.
Produce Marketing ..	—	215	Appointment of Authorised Officers	Appointment of officers authorised to issue licences under the Produce Marketing Ordinance, 1953.
Produce Marketing ..	—	222	The Scheduled Produce (Non-applicable of Provisions) Order, 1962 ..	An Order specifying the crops and districts to which subsection (1) of section 25 of the Produce Marketing Ordinance, 1953, will apply.
Plant Protection ..	—	243	The Plant Protection (Fumigation of Imports) <i>Tragodema Granarium</i> (Amendment) Order, 1962 ..	An Order amending the Ordinance in the control of <i>Tragodema Granarium</i> .

DEPARTMENT OF AGRICULTURE
STAFF POSTINGS AS AT 31st DECEMBER, 1962

A. ADMINISTRATIVE AND EXTENSION SERVICES

<i>Title</i>	<i>Name</i>	<i>Station</i>
<i>Director of Agriculture</i> ..	W. V. Rose ..	Entebbe.
<i>Deputy Director of Agriculture</i> ..	G. W. Anderson ..	Entebbe.
<i>Assistant Director of Agriculture</i>	H. R. Berunga, M.B.E. ..	Entebbe.
<i>Assistant Directors of Agriculture (Field)</i>	Major W. H. Edwards, M.C. ..	Entebbe.
	D. J. Parsons, M.C. ..	Eastern Region.
	G. L. Kigundu, M.B.E. ..	Buganda.
<i>Senior Agricultural Officers</i> ..	R. G. Hampson, D.F.C. ..	Western Region.
	Z. N. Kwebiha, M.B.E. ..	On leave.
<i>Chief Agricultural Development Officer</i>	P. Evans-Jones, M.B.E. ..	Namalere.
<i>Economist</i>	J. H. Cleave ..	Entebbe.
<i>Agricultural Officers</i>	R. B. Johnston ..	Seconded to St. Helena.
	A. G. Ousley-Smith ..	West Nile.
	A. R. Dunbar ..	Bunyoro.
	A. D. R. Ker ..	Bukedi.
	A. R. Humphrys ..	Busoga.
	K. M. L. Mathews ..	Toro.
	J. C. Phillips ..	Ankole.
	J. B. Warren ..	Bugisu.
	G. R. W. Onaba ..	Teso.
	J. S. Laker ..	Northern Region.
	S. S. M. K. Sengendo ..	Mubende.
	J. M. Byagagaire ..	Kigezi.
	L. M. A. Nyakaana ..	On overseas course.
	E. A. Odeke ..	Busoga.
	T. M. Othieno ..	Acholi.
	D. Odanga ..	On overseas course.
	F. J. Luswata ..	Buganda.
	P. F. Kunya ..	Bowa.
	V. Kirabokyamaria ..	On overseas course.
	W. A. Kneale ..	Bunyoro.
<i>Agricultural Engineer</i> ..	D. J. Innes ..	Namalere.
<i>Agricultural Officers (Uganda)</i> ..	P. M. Sali ..	Masaka.
	S. M. N. Kijambu ..	Mukono.
	G. A. Fennell ..	Entebbe.
	A. G. K. Will ..	Toro.
	T. K. Otim, M.B.E. ..	Lango.
	S. M. B. Mutagwanya ..	Mpigi.
	J. G. Wanyoto ..	Bugisu.
	H. D. Mubiru ..	Kawanda.
	Y. K. Musisi ..	Kawanda.

STAFF POSTINGS

A. ADMINISTRATIVE AND EXTENSION SERVICES—continued

<i>Title</i>	<i>Name</i>	<i>Station</i>
<i>Senior Assistant Agricultural Officers</i>	J. M. Sekimpi	Bowa.
	R. K. Kachope	Kitgum.
	J. B. O. Baguma	Toro.
	Y. E. Onaba	Bukedi.
	J. M. Luzinda	Masaka.
	H. G. N. Semambo	Buganda.
	T. F. Ellis	Ankole.
	E. B. Sarulo	Bugisu.
	A. K. Mulera	Masaka.
	P. S. Bulera	Mpigi.
	Y. Yigga	Mpigi.
	C. M. Kapalaga	Masaka.
	A. G. Kibulo	Bugisu.
	J. N. Kimoimo	On overseas course.
	S. L. Takirambudde	Buganda.
	I. M. Bulikiro	Bunyoro.
	H. W. Muloki, O.B.E.	On leave.
	Z. N. Wanyama	Bukedi.
	S. B. Kikule	Masaka.
	D. E. Kawalya	Mubende.
	J. C. Ssozi	U.K. on scholarship.
	I. L. Lubwa	Acholi.
	N. O. Z. Sakio	Teso.
	G. S. K. Byakika	U.K. on scholarship.
	P. E. K. Sibytekerwa	U.K. on scholarship.
	G. W. B. Gowa	Canada on scholarship.
	J. J. Oloya	U.K. on scholarship.
	J. S. Ikara	On overseas course.
	P. Menya	On leave.
	F. X. Lubega	U.S. on scholarship.
	J. Obbo	U.K. on scholarship.
	J. Walimbwa	Bugisu.
	S. L. L. Kyeyune	Mukono.
	A. S. N. Mukacha	Busoga.
	E. Odhuba	Lango.
	K. M. I. Popiel, M.B.E.	Buganda.
	F. Bateman	Bukedi.
	M. H. F. Low	Bunyoro.
	H. D. Paterson	Bunyoro.
	J. E. Ludlow	Mukono.
	M. J. Wegg-Prosser	Bukedi.
	N. Oldacre	Lango.
	R. S. Haines	Ankole.
	G. A. Rea	Mpigi.
	R. D. Scott	Busoga.
	W. J. F. Hill	Toro.
	J. M. Edwards	Busoga.
	R. G. J. Revell	West Nile.
	D. F. P. McCunnall	West Nile.

STAFF POSTINGS

A. ADMINISTRATIVE AND EXTENSION SERVICES—continued

<i>Title</i>	<i>Name</i>	<i>Station</i>
<i>Senior Assistant Agricultural Officers and Assistant Agricultural Officers—(continued)</i> ..	J. Ogwang	Acholi.
	R. C. Mayindo	Kigezi.
	M. B. Wright	Bowa.
	J. P. Bulleid	Bukedi.
	D. J. Westwood	Teso.
	D. A. Smith	Toro.
	R. H. Dengate	Eastern Region.
	R. G. Benson	Bukedi.
	N. J. P. Hewett, B.E.M. ..	Western Region.
	J. T. Cowie	Namalere.
	E. B. Rwakaikara	Bunyoro.
	I. L. Fisher	Kigezi.
	D. A. Carmichael	Teso.
	W. M. K. Permain	Busoga.
	C. J. Lee	Masaka.
	D. F. Harper	Lango.
	T. Ward	Teso.
	G. W. Roberts	Acholi.
	J. R. Morgan	Mityana.
	J. L. Walker	Buganda.
	P. McConnachie	Kigezi.
	S. N. C. Foye	Eastern Region.
	R. Morgans	Mukono.
	B. J. R. Handscombe	Mubende.
<i>Senior Field Officers and Field Officers (Agriculture)</i> ..	G. M. Ross	Mukono.
	J. L. McCumiskey	Namalere.
	J. G. Wilson	Karamoja.
	A. J. S. Armitage	Namalere.
	H. B. Miller	Northern Region.
	J. Tilley	Bunyoro.
	A. L. Stephens, M.B.E. ..	Teso.
	M. F. Merchant	Ankole.
	G. K. Petrie	Western Region.
	W. J. McClement	Namalere.
<i>Senior Marketing Officer</i> ..	P. J. Boustead	Entebbe.
<i>Mechanical Cultivation Officer</i> ..	E. W. Kalanzi	Namalere.
B. EDUCATION		
<i>Principals</i>	D. C. Todd	Bukalasa Agricultural College.
	J. R. Low	Arapai Agricultural College.
<i>Agricultural Officers (Women)</i> ..	Miss J. Wood	Bukalasa Agricultural College.
<i>Agricultural Officers</i>	E. S. T. Marshall	Arapai Agricultural College.
	G. K. Reakes-Williams ..	Bukalasa Agricultural College.
	T. E. F. Weavind	Bukalasa Agricultural College.
	E. B. Galukande	Bukalasa Agricultural College.

STAFF POSTINGS

B. EDUCATION—continued.

<i>Title</i>	<i>Name</i>	<i>Station</i>
<i>Biologist</i>	R. C. Edworthy	Bukalasa Agricultural College.
<i>Senior Assistant Agricultural Officers and Assistant Agricultural Officers</i>	E. Kyagaba	Bukalasa Agricultural College.
	P. Sempa	Mukono District Farm Institute.
	R. A. Irigiei	U.K. on scholarship.
	J. C. M. Ddungu	U.K. on scholarship.
	N.G. Tuck	Arapai Agricultural College.
	P. W. Taylor	Ikulwe District Farm Institute.
	R. M. Baker	Tororo District Farm Institute.
	A. W. J. Todd	Bukalasa Agricultural College.
	M. Astbury	Arapai Agricultural College.
	D. C. Collin	Ngetta District Farm Institute.
	F. X. Luyomba	Bushenyi District Farm Institute.
	H. J. McKilligan	Bushenyi District Farm Institute.
	G. S. Hawkesworth	Bukalasa Agricultural College.
	M. D. Macleod	Bukalasa Agricultural College.
	D. A. Trotman	Kyembogo District Farm Institute.
	N. F. S. Hetherington	Bukalasa Agricultural College.
	P. A. J. Julnes	Arapai Agricultural College.
<i>Bursars</i>	G. H. G. Stacey	Bukalasa Agricultural College.
	A. I. Gafabusa	Bukalasa Agricultural College.
	D. E. K. Muganga	Arapai Agricultural College.

C. RESEARCH DIVISION

<i>Senior Research Officers</i>	J. Bowden	Kawanda.
	D. G. Thomas	Kawanda.
<i>Entomologists</i>	W. R. Ingram	Kawanda.
	J. C. Davies	Serere.
	D. N. McNutt	Mbale.
	F. K. Kasule	Serere.

STAFF POSTINGS

C. RESEARCH DIVISION—continued.

<i>Title</i>	<i>Name</i>	<i>Station</i>
<i>Senior Chemist and Chemists</i> ..	D. Stephens ..	Kawanda.
	B. Butters ..	Kawanda.
	M. N. Court ..	Serere.
<i>Botanists</i> ..	D. J. Butt ..	Kawanda.
	J. W. Dancer ..	Kawanda.
	C. A. L. Leakey ..	Kawanda.
	S. K. Mukasa ..	Kawanda.
	A. J. Tribe ..	Serere.
<i>Agronomist</i> ..	G. E. D. Tiley ..	Serere.
<i>Soil Survey Officer</i> ..	J. F. Harrop ..	Kawanda.
<i>Agricultural Officers</i> ..	C. R. Horrell ..	Serere.
	W. Hadlow ..	Kawanda.
	T. H. Stobbs ..	Serere.
<i>Senior Assistant Agricultural Officers and Assistant Agricultural Officers</i> ..	A. Kanya ..	Bukalasa.
	T. R. Odhiambo ..	U.K. on scholarship.
	D. M. Patel ..	Kawanda.
	R. O. Wheeler ..	Serere.
	J. B. Littlewood ..	Kawanda.
	W. P. Beattie ..	Bugisu.
	P. W. Newhouse ..	Serere.
<i>Senior Field Officers and Field Officers (Agriculture)</i> ..	T. R. Jones ..	Kawanda.
	J. R. Mayne ..	Kawanda.
	S. E. Mabey ..	Kituza.
	J. R. Cochrane ..	Serere.
	D. E. H. Clegg ..	Kituza.
	W. G. Foggon ..	Kawanda.
<i>Curator, Botanic Gardens</i> ..	Z. K. Katerega ..	Entebbe.
<i>Executive Officers</i> ..	Lt.-Col. D. Macdonald ..	Kawanda.
	P. K. Lukwago ..	Serere.
<i>Spectographer</i> ..	E. W. Hughes ..	Kawanda.
<i>Librarian/Abstractor</i> ..	Miss C. M. Horn ..	On leave.
<i>Statistical Assistant</i> ..	L. F. Lobo ..	U.K. on scholarship.

E. BUGISU COFFEE DEVELOPMENT SCHEME

<i>Field Officers</i> ..	V. V. Millett ..	Bugisu.
	F. P. Smyth ..	Bugisu.
	D. K. Pochon ..	Bugisu.
	C. R. Hullock ..	Bugisu.

F. COFFEE DEVELOPMENT SCHEME—WESTERN AND NORTHERN REGIONS

<i>Field Officer</i> ..	J. M. Thomson ..	Mbarara.
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